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The Province of Alberta

IN THE MATTER OF "THE NATURAL
GAS UTILITIES ACT"

—and—

IN THE MATTER OF an Enquiry into
Scheme to be adopted for Gathering,
Processing and Transmission of
Natural Gas in Turner Valley

G. M. BLACKSTOCK, Esq., K.C., *Chairman*

Dr. E. H. BOOMER, F.C.I.C., *Commissioner*

Session:

CALGARY, Alberta March 27th, 1945.

VOLUME 15

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(Recalled)

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27th March, 1945.
9.30 A.M. session

MR. BLANCHARD: Mr. Chairman, I thought perhaps I had better mention now, as I stated before, that I cannot be here tomorrow afternoon in view of the fact there is a criminal case to be tried at 2 o'clock. I do not know whether the Board will decide just to carry on or not but it will be well to clear the matter up at the present moment so that counsel might make their arrangements accordingly. In that connection, Dr. Katz is very anxious to leave tomorrow evening because he has an engagement immediately after Easter in Louisiana. Therefore, if you are not through with Mr. Stevens-Guille today, I would very much like to call Dr. Katz tomorrow morning so he can be permitted to go.

THE CHAIRMAN: I understand there is some suggestion that some of the Court Reporters may not be available tomorrow afternoon either.

MR. BLANCHARD: One Court Reporter may not. That is Mr. Taylor.

MR. CHAMBERS: Would it meet the convenience of Mr. Blanchard and Dr. Katz, as far as I am concerned and those who are with me, if you want to sit a little longer today or tomorrow morning that will be all right.

THE CHAIRMAN: Would this suggestion be acceptable, depending on how the cross-examination of Mr. Stevens-Guille goes, that we might sit till 12.30 today if need be and perhaps for 15 minutes longer in the afternoon than usual and have Dr. Katz first in the morning and then adjourn tomorrow at 12.30 and have no sittings in the afternoon.

MR. BLANCHARD: That, sir, would be very satisfactory to me. Of course I do not want to put everyone out because of my engagement, but that is my reason for desiring to have

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Dr. Katz disposed of tomorrow.

THE CHAIRMAN: And you made your engagement at a time when you thought you were going to be free in the afternoon.

MR. BLANCHARD: Yes, and it cannot be changed because Friday is a holiday and this case will not be concluded until late on Thursday.

THE CHAIRMAN: Is it a jury trial?

MR. BLANCHARD: No, sir.

THE CHAIRMAN: Is that suggestion agreeable to everyone?

MR. STEER: Yes, sir.

MR. CHAMBERS: Yes, sir.

MR. HARVIE We might review the situation at 12.30, when we will know how we are getting along more than we do now.

THE CHAIRMAN: Yes. All right, Mr. Chambers.

MR. CHAMBERS: Before Mr. Stevens-Guille proceeds you will recall that yesterday my friend, Mr. Blanchard, asked Mr. Connell to make a computation and it might be of assistance if I put it in now, So that Mr. Connell will go in the box for a moment.

GORDON A. CONNELL recalled by Mr. Chambers.

Q Will you explain what this is?

A This is a statement Mr. Blanchard asked from me yesterday. I quoted the figures and they are already in the record. This is a statement of gas reserves down to 250 pounds per square inch calculated by the Material Balance method, using Dr. Katz' figures for the bottom hole pressure as shown in the supplementary report plus 200 pounds per square inch and also calculated down to 350 pounds per square inch in the reservoir as of January 1st, 1945. For North Turner Valley we have also calculated for a bottom hole pressure of 300 pounds greater than that shown by Dr. Katz. I gave the results yesterday. To this report I have added this comment "Due to the lower volumes of gas

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and oil obtained and the increasing difficulty with liquid loading as the reservoir pressure declines, it is my opinion that it will not be economical to produce the crude oil wells down to a reservoir pressure of 350 pounds per square inch. This is not a 24 hour bottom hole pressure but a true reservoir pressure.

STATEMENT, ESTIMATES OF GAS RESERVES
IN CRUDE OIL AREAS (MATERIAL BALANCE
METHOD) NOW MARKED EXHIBIT 49.

THE CHAIRMAN: I am going to suggest after you have had your copies of this exhibit and if you wish to cross-examine Mr. Connell at a later date on it, you will of course have an opportunity of doing so.

H. LeM. STEVENS-GUILLE, by Mr. Chambers.

THE CHAIRMAN: Are you ready, Mr. Chambers?

MR. CHAMBERS: I would like the witness to carry on from where he left off yesterday.

A At the close of the sittings yesterday, I had just gone through the report M-2, Exhibit No. 47, to the point of reaching the tables at the end. I then suggested that I should go through Table 8 but I am going to suggest a variation if it meets with the Board's approval and we take report M-2A now, without reading it completely but going through it and seeing the points of difference between it and the report M-2 (Revised). Report M-2A, Exhibit No. 48, as explained yesterday, was prepared using the second of the two sets of operating conditions predicated in Mr. Connell's report M-1, Exhibit 44. The second set of conditions took the crude oil wells down to the point of abandonment of 10 pounds and the gas cap wells down to 100 pounds per square inch bottom hole pressure, which was the same conditions for the gas cap wells as assumed under Mr. Connell's first set of operating conditions. It is just, therefore, the crude oil well

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operating conditions that have been varied. Now the report M-2A has been set up in exactly the format as the report M-2 (revised) so that an easy comparison can be made of the differences all the way through. Therefore I do not think it would serve any useful purpose to read it all through and I propose just going through it and calling attention to the points of difference as I go along. Firstly, starting on page 1. Before page 1 there is the foreword that merely explains what I have already covered, the reason for the report being prepared. Now page 1, the first point of notice is that using these operating conditions the conclusion is reached that the total residue gas volume of 301 billion, that is on a residue gas basis, or 382 billion on a wet gas basis, a total of 78 per cent of the reserves estimated by Mr. Connell can be economically delivered to the market. That compares, of course, with 361 on a residue gas basis in the report M-2 (Revised). Turning to page 2, a recapitulation has been made showing what proportions of the total reserve of 487.4 billion, wet gas basis, that Mr. Connell computed would be available, will be actually used in the market according to the conclusions reached in this report that I am now reading. Starting with the volume flared and used on the lease, this will amount to 51 billion cubic feet, wet gas basis, or 10 per cent of the total. The volume flared as residue gas in 1944 or used for drilling fuel in 1944 - 1945 is 9.8 billion on a residue gas basis or 13.1 on a wet gas basis or 3 per cent of the total. Actual marketable reserves 311.1 residue gas basis and 381.5 wet gas basis, 78 per cent of the total.

(Go to page 1185)

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The remaining reserve or balance which is estimated will not be produced from the field is 41.8 billion on a wet gas basis or 9% of the total. These add up to the 478.4 billion wet gas basis given by Mr. Connell in Exhibit 44.

I would point out, Sir, that the balance or remaining reserve left in the field is not down to zero pressure. It is down to the conditions assumed by Mr. Connell in his report, that is to say, 10 barrels a day production for crude oil wells and 100 pounds bottom-hole condition on the gas cap.

If these estimates are correct the market, as estimated, will be provided for for some 27 years but in the last six years the capacity of the wells will be insufficient to provide for peak loads and the auxiliary sources of supply will therefore have to come into effect at that time.

Turning over now to page 3; the three gas gathering systems as covered yesterday are set out in exactly the same way and the same general procedure was followed in determining the suitable operating pressure for the gas gathering system, I mean there is no new feature to point out in that connection. At Madison Compressor Station No. 1 the same conclusion was reached, that 60 pounds suction pressure would probably be the lowest pressure to go down for.

The same situation in general arises with regard to excess residue gas from the crude oil wells for a number of years and the same provisions are covered for returning it to the formation in Turner Valley or for storing it in Bow Island.

Turning now to page 5: The same assumptions are made with regard to the Brown Allowables that when there is insufficient gas under the Brown Allowable to supply the market, the Brown Allowable will be lifted, permitting withdrawals to be made up to market requirements. It will be noted in going

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through that the date at which certain events are estimated to be going to happen are for a little earlier than in report M-2 revised.

Passing on to page 6: The Madison Compressor Station No.3: The same operating conditions have been estimated and the only difference is again one upon which certain conditions will occur. There is no change in the general principal suggested as probably the most suitable for operating the station. The same provision is made for keeping the station loaded. The three gas cap wells connected to this station will be produced in a manner to keep the load factor to 100% for as long as that is possible.

Going now to the British American gas gathering system: The same assumptions had to be made in order to be able to work out the probable figures that would be handled by these systems and there are no changes in those assumptions. On the low pressures system of the B.A. the same general conditions apply as in the previous report.

Turning to page 9, to the bottom of page 9, the treatment of the Brown allowables is the same as in the case of the Madison system and as in the case of the previous report, Exhibit 47.

Turning to page 10 and going to the Gas and Oil Products gas gathering system, the same assumptions as to the general operating systems have been made as in the previous report and the treatment of the system as a whole follows along the same lines and once again a review is made of what would happen should the Gas and Oil Products plant shut-down at a date earlier than shown in this report and it was found that the volumes of gas that would then not be gathered, could be handled by the Madison Compressor Station No.3 or by the British American installations.

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Passing to the conclusion of the report on page 12, we reach the figure again at the outset with ^{the} reserves on a residue gas basis, assuming the conditions of operation on the crude oil wells and gas cap, will be reduced to 311 billion cubic feet as compared with the 361 billion cubic feet in Exhibit 47.

Passing to the tables: There are first, - the three summaries which reconcile these figures with the figures given in Mr. Connell's report, indicating where it is estimated all the gas will go, the volume which will be flared, the volumes which will be used for fuel, the losses, the shrinkage in processing and the amount that it is assumed will be left in the formation if the operations shut down on the date predicated in the report.

Passing on to the tables: These have been made up in the same way as the tables in the previous report and I do not think there is any useful purpose would be served in going through them individually again.

I would draw your attention to one point which has been added to this report for general convenience and that is foot notes at the bottom of each table, if the figures are carried forward to another table. Take for example table 5, the foot note explains that the figures carried from column 4 to Table 8, which is the big table in the pocket on the back cover of the report, - one of two big tables, and to column 8, - I am sorry, table 8, column 2. This makes it easier for people to follow through the construction of table 8. That is done on all the subsequent tables.. Table 6 has the same information.

Now if you will get table 8; firstly on table 8 on column 2 after the date there is a note on the second column, not the date, the titles of the various gas gathering systems have been abbreviated and "M-G-'G-S" stands for the "Madison Gas Gathering System". "B.A." "British American". "G.O.P" "The Gas and Oil

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Products". "R.O.C" gas cap""The Royalite Gas cap", in the North end of the field.

Q MR. MCDONALD: Is it the revised table 8 you are referring to?

A Yes, no. Table 8 in the back of report M-2A, both the table 8.

MR. CHAMBERS: Attached to Exhibit 48?

MR. MCDONALD: Yes, but we were looking at Exhibit 47.

THE WITNESS: I have been turning over and talking from Exhibit 48.

Q MR. HARVIE: They are set out both the same?

A Exactly the same, generally set out. There is only the change in the actual figures.

The object of table 8 was to obtain the amount of gas that cap gas/would have to be withdrawn each year to meet the estimated market requirements and in order to do that it was necessary to study the amount of crude oil gas that would be available, not merely in average figures for year, but during the year and a breakdown of that has not been shown in table 8. It would have been too large to be handled in a report of this size but by use of load factor diagrams the amount of crude oil gas^{that}/could be usefully used in the market, due to the loading conditions and the amount that could not enter the market and would have therefore to be stored, was determined.

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And that was done for each year in succession while there was any gas to be stored. The point of that is an obvious one, of course, that during such a season as the present one there may be more crude oil gas available on one day than the market can absorb. The balance in excess of market requirements will therefore have to be stored, but the very next day the market demands, due to a storm, may have increased largely and the volume of residue gas from crude oil wells available will be insufficient to meet that demand, making it necessary to withdraw gas from the gas cap. You cannot in actual fact, of course, work on average figures to arrive at that. It must be done on a load factor diagram and we did that, basing our diagrams on the experience of load requirements during past years.

MR. BLANCHARD: Past years?

A Past years. Following through Table 8, from left to right, in column one, we have the wet gas available shown in totals against each of the gas gathering systems, would be Royalite Gas Cap, shown separately, and in column two we have those same totals reduced to their equivalent in residue gas. The reductions include wet gas used for fuel in the operation, residue gas used in plant operations, shrinkages to vapors and extraction of absorption gasoline, and also loss in the purification stage, due to the removal of hydrogen sulphide and carbon dioxide. These reductions have all been brought together in one factor for each system for simplicity in showing the figures on a table this size. The order of accuracy is, of course, well within the order of accuracy of estimating figures over a number of years such as is shown on this table.

In column three the residue gas used for drilling fuel is deducted from the residue gas volume in column two. It will be noted that after 1945 it is assumed that drilling in Turner Valley will be completed and no further residue gas will

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be used for drilling fuel. This leaves in column four the residue gas volume that is available for the market and in column five we find on the basis of the figures in column four, the percentage sharing position of each gas gathering system.

Now in our later report the question of the sharing position is to be taken up in detail. Therefore I am not proposing to go into it at this point. This is merely to show why we had to prepare a table of this nature and work the figures out in this amount of detail in order to reach the conclusion in our report.

From column five the percentages give in tables in column six the share of the market for each of the gas gathering systems, and in column seven are computed the actual deliveries of gas based on the share of the market in column six.

Now at this point it is necessary to note the difference in the method of delivery of the various gas gathering systems. Going to the year 1945, because there was no sharing position in 1944, it will be noted in column six that the Madison gas gathering system has an estimated sharing position, share of the markets, in column six of 8,364,000,000, but it had available to the market as shown in column four 12,419,000,000.

MR. CHAMBERS: Mr. Stevens-Guille, you referred to tables, it is columns.

A I beg your pardon, it is columns.

MR. STEER: That is right through the last few minutes.

A Will you correct that on the record, column instead of table? We were at column four. The difference between the share market in column six and the residue gas available for the market in column four, would have to be either flared or returned to the formation if each of the other gas gathering systems, including the Royallite Gas cap were to deliver to the market its share.

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MR. HARVIE: Excuse me, Mr. Chairman, I wonder if this has not more to do with the sharing position of the market than it has to do with the actual reserves and if we get into this, it might extend the Cross-examination much longer than if we stick to the reserves.

THE CHAIRMAN: What I think, Mr. Harvie, is Mr. Stevens-Guille predicated his little discussion on this with the remark that this feature would be taken up in detail at the proper time and I judge this is merely explanatory as to show -

A It is necessary to show the mechanism of building up this total.

Q But you do not intend to suggest that these are the figures at the moment representative of the respective sharing positions?

A I do not intend to offer any supporting evidence to justify this as a possible method of handling the share positions.

Q You intend that to come under Item #4 on our suggested agenda?

A That is right.

MR. HARVIE: And any questions to be asked on that then will be dealt with at the end?

THE CHAIRMAN: Yes.

A I think it will only take a matter of two or three minutes just to carry through the mechanism of this so that everybody can understand why we had to go to the length of preparing this table.

The point we left was that as an example, the Madison gas gathering system is estimated to have available to the market 12,419,000,000 as shown in column four, whereas its estimated share of the market under the system we are offering as a proposal is shown in column six to be 8,364,000,000. The difference would have either to be flared or returned to the formation if each of the other gas gathering systems, including the Royalite gas cap were to deliver their share of the market. To avoid having to instal the large size installation that would be

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necessary to return all that gas to the formation, a method has been proposed whereby that gas will enter the market currently and an equivalent volume of gas cap gas will be conserved in the Royalite gas cap. The same applies with regard to the residue gas from the Gas & Oil Products plant, which is in excess of its share of the market. In the case of the British American, the position is different. They have to make provisions to return this excess gas currently to the gas cap in their area and as will be noted in columns six and seven the share of the market and the actual deliveries are shown as the same figures. Following that system through it will be noted that the Royalite gas cap has a share of the market in column six, of 4,844,000,000, but in column seven it is estimated that it will only deliver to the market 2,000,053,000. During the summer months when the demands of the market are less than the volume of residue gas available from crude oil wells, it will in any event be necessary to physically return the excess residue gas from crude oil wells to the formation or to Bow Island. Both the gas stored and the gas conserved estimates have been shown under the individual systems in columns fifteen to twenty-two inclusive, and I think the method of distribution is clear without spending the time to go through it in detail. The Royalite gas cap position is shown in columns eight, nine and ten, and I note that the title "Royalite gas cap" has been omitted on the report M 2A, table 8. It might be well to write that in over columns eight, nine and ten. Column eight showing the volume that is estimated that will go to market. Column nine showing the amount that this is below the withdrawal permitted by the Brown Plan.

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A And Column 10 showing the amount that it is below the gas cap as shown below share of market. Now that pressure has been followed through year by year until, according to the assumptions made in the reports there is no crude oil gas coming to the market. When the time is finally reached when the gas cap operating under the Brown Plan will not be able to supply the peak load of the market. It is then assumed as we have said, that the Brown Plan will no longer be in force, in the present formula at least, and the market is supplied by the gas cap of the Royalite area and the B.A. area proportionately. That is carried down on the method of cut-offs that are explained for each system in the report, down to the year 1970, and the totals that the system will have delivered are given at the bottom of the page. These figures, of course, are based on the assumptions that we have made in our report. If any of those assumptions are materially altered there would have to be a recomputation of Table 8.

Also in the back of the report M-2A is a Table 9. Table 9 is constructed in much the same way as Table 8, but has added to it on the right hand in Column 14, the volume of reserves that we estimated were available as from January 1st, 1944, and then in the successive columns the amount of those reserves withdrawn each year, and this process was carried on year by year so that we wind up at the bottom with the amount of the reserves we estimate will be still in place at the end of the period reviewed, or in 1970. That was prepared as a matter of convenience to everybody to show how the suggested systems would work out in practice.

There was one other point that I might say a word usefully on, and that is the peak demand. As is well known this system has a very different load factor. By that

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I mean the market demands fluctuate widely. The range at the present time is from a low of 20 million cubic feet per day in the summer to a maximum of a little over 80 million cubic feet in winter. During any one day the load can fluctuate widely varying from 35 to 40 million up to 75 to 80 million during a Chinook period. It became necessary to estimate in what year those peak demands would be unable to be met. Mr. Connell explained the curves he set up to estimate the capacity of the gas cap wells as the pressure of the reservoir decreased, and it was these curves that we used to obtain the point at which those peaks could no longer be met.

It so happens the rate is fairly rapid, therefore, the year which we have shown as the probable one in which an auxiliary supply will be required might be out by a year or so, but it is not likely to be very far from the correct date. In estimating those peaks consideration, of course, must be given to the capacity of the Calgary lines as well as to the actual load requirements. It has been the practice for several years during peak periods to turn the Foremost field into the system and to supply there part of the requirements that cannot be met from Turner Valley.

Q DR. BOOMER: That is to the pipe line limitation?

A Yes, to the pipe line limitation, and that does apply to some of the years under review, but for others the estimated peak requirements of the system are below their capacity. That, I think, Mr. Chairman, concludes all I have to say at the moment.

Q Before you leave these Tables, one thing I am not so sure of, in Table 8, Column 21, what is the meaning of Gas Conserved by G.O.P.?

A Well the G.O.P. system is on the same basis as the Madison

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Gas gathering system. It has no provision of its own for returning gas to the formation. Therefore, under the proposed system of sharing the market, which is discussed at more length in the M-4 report to be presented later, it is suggested that in order to keep down the size of the installation at the Madison Plant for returning gas to the limestone, the G.O.P. gas will enter the market to the fullest amount available, and gas from the Royalite gas cap will be under-produced an amount equal to the quantity of gas from G.O.P. that enters the market above its sharing position, and in order to give that quantity a term which could be used by everybody, we have called that "Gas Conserved".

Q You would not put that back into the gas cap?

A No.

Q MR. CHAMBERS: Mr. Stevens-Guille, would you turn to the foreword in Exhibit 48?

A To which page?

Q The foreword. You might just deal with that, if you please. I have particular reference to the second last paragraph.

A The first part of the foreword I have already covered, but the second last paragraph might be as well if I read that into the record. There will be no one economic

Q THE CHAIRMAN: Which one?

A Exhibit 48.

THE CHAIRMAN: Exhibit 48?

A Yes, the foreword, Sir.

Q The foreword?

A Yes, and the second last paragraph. There will be no one economic limit to the life of all wells in the field. The economics of production are governed by several variable factors such as the number of wells produced by the operator,

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the gas volume produced, the amount of attention required by the well and similar circumstances, as well as the price of oil and gas. The volume of gas recovered from crude oil wells will therefore depend to what degree unitization of groups of wells is carried out, and satisfactory means are found to eliminate wells being killed by liquid loading. The estimated 361 billion cubic feet, the marketable reserve quoted in Madison Report M-2 revised, Exhibit 44.

Q MR. CHAMBERS: Exhibit 47.

A Yes, Exhibit 47. The marketable reserve quoted in Madison Report M-2 Revised, Exhibit 47, will be possibly obtained if it is practical to carry fully into effect unitization and elimination of liquid loading. If it were found impossible to do this, the economic marketable reserves might be only 311 billion cubic feet.

In actual practice the probability is that the economic marketable reserves will be somewhere between the 311 and 361 billion cubic feet.

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Q I take it that last paragraph you have just read is your own personal opinion, having regard to your experience in the field and your knowledge of the operations. Would that be a fair way of putting it?

A That, I think, represents it. I think I might enlarge a little bit on what has been stated there. It is a very difficult thing to go in and estimate reserves that can economically be brought to the market when there are so many variable factors which are for any opinions not determinable exactly and in some cases will actually depend on occasions possibly on some of the rulings of the Board. Therefore any report made at this stage must obviously be a compromise. We have got to go on the best information available and make a large number of assumptions. Some of the factors that will enter into it will not be clarified for a number of years at any rate. Others will be brought down to terms in which it can be more readily used for estimating purposes, possibly after this hearing is completed, but the opinion expressed at the end here is the best information we can arrive at at the present time and it is merely offered as a working figure to use in arriving at some of the other factors that have got to be decided.

MR. FENERTY: Just a moment before proceeding. I was rather curious to know the purpose of that question, if that was the witnesses' own personal opinion in regard to the economic production, can it be that the company he represents have disassociated themselves from this opinion and this is only the personal opinion of this witness. I think we should know.

MR. CHAMBERS: My position is I am prepared to accept the recommendations and statements of this witness.

MR. FENERTY: I would assume that was the company's position. Just so long as we understand that.

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MR. CHAMBERS: Just one or two questions and then I will be through with this witness at this stage of the Hearing.

Mr. Stevens-Guille, when did Royalite first put in a gas gathering system for delivering gas to the market?

A I was not there at the time but to the best of my recollection of what I have been told, it would be back in 1921 from Royalite 1, 2 and 3, which are wells producing gas at upper sands and not from the limestone.

Q Then Royalite 4 came into production when?

A In October, 1924.

Q Now what happened or what extensions were made after Royalite 4 came into production?

A Royalite 4 carried hydrogen sulphide in the gas which was not the case in Royalite 1, 2 and 3. Therefore it became necessary to purify the gas before it could be sold in the market and a scrubbing plant was therefore designed and constructed and I believe went into operation for the first time at the end of December 1924.

Q Then it is from about that time that the gas supply to the Calgary Gas Company came from what is now known as the gas cap?

A That is right. It started as from that date.

Q That would be Royalite 4 well, that is the first gas cap well, is that right?

A That is right.

Q When was the absorption plant built?

THE CHAIRMAN: Mr. Chambers, are you not opening the door? That might involve cross-examination of a very lengthy character or is your purpose merely to show a reason for the shrinkage in the gas?

MR. CHAMBERS: My only purpose in leading this, and I can lead it later from this witness, is to give the Board and put on

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record the history of this field, a general history of the Turner Valley field, But I am quite prepared to deal with it later.

THE CHAIRMAN: I think it would be wise, Mr. Chambers.

MR. CHAMBERS: All right.

Q Just to summarize - probably you have covered this but I want to make sure it is in specific form - do I understand correctly, Mr. Stevens-Guille, that the total over-all volume of crude well gas for 11 years from and including 1945 would likely in the aggregate equal the total aggregate market requirements for that period?

A Yes, that is correct. That is what our examination of the situation shows and as is reported in the narrative.

Q Can you tell us, during this last winter how much of the peak load demand was taken care of by the gas from the crude wells?

A I think I have that here. Yes, on the peak load day 63 per cent of the load was supplied from the gas cap.

MR. BLANCHARD: What date would that be?

MR. CHAMBERS: I have asked for the crude wells.

A Well the balance of 37 per cent would have been supplied by the crude oil wells.

Q MR. HARVIE: When would that be, this winter?

A Yes, it was in January. I cannot give you the exact date out of my head.

Q But it was this winter?

A Yes.

Q MR. STEER: What was the total volume?

A The total volume processed at the gasoline plant on that day was 97,535,000. Actually I have the date. It was December 31st, 1944.

Q MR. CHAMBERS: For the purposes of the record, can you give us it in cubic feet rather than in per centage? Have you

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that available?

A Yes, the amount of crude oil gas processed in the gasoline plant that day, which ultimately went to market, was 34,694,000 cubic feet

Q Turning to page 6 of Exhibit 47, and I am referring to the third paragraph. There is a comparable statement on the same page of Exhibit 48. Now this is the question. Why do you say there in those paragraphs that when the annual deliveries from the field dropped to 7.4 billion cubic feet in the case of Exhibit 47 and 7.6 billion cubic feet in Exhibit 48 - and those figures as I understand it are about 60 per cent of the market.

A That is right.

Q That at that stage the operations in the field will cease. Why do you make that statement?

A Well that is an entirely arbitrary assumption. At this time ahead it is not possible to state what the situation in the Calgary area supplied by this system will be, what other sources of supply of gas will be available and therefore it is just a question of whether the operation would close down in that year or possibly a year or two earlier or possibly a year or two later. The supply would naturally be a diminishing proportion of the total requirement as the years went on and it would only be two or three years subsequent to the date indicated that there would be sufficient to supply any appreciable quantity of the market.

Q Now would you turn to Table 5 of Exhibit 47 and merely for the purposes of the record I am putting this question, As I understand, according to that Table 5 of Exhibit 47 the Madison system will handle from 1944 to 1964, both inclusive, 145.7 billion cubic feet of wet gas or 120.58 billion cubic feet of dry crude gas.

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A That is correct.

Q And then merely for the purpose of getting the same estimate on the basis of Exhibit 48, would you turn to Table 5 of Exhibit 48, and it is my understanding that according to Table 5 of Exhibit 48, the Madison system will handle from 1944 to 1955, both inclusive, 96.7 billion cubic feet of wet crude gas.

A That is correct.

Q Or 80.1 billion cubic feet of dry crude gas.

A Yes, those figures are correct.

Q Now Mr. Stevens-Guille, I understand that you have prepared for the convenience of the Board and other parties, a summary of the different estimates that have been made, converting that summary as of January 1st, 1944.

A That is correct.

SUMMARY OF GAS RESERVES- ESTIMATED
FOR THE TURNER VALLEY FIELD AVAILABLE
TO MARKET NOW MARKED EXHIBIT 50.

Q Have you anything to say in explanation of Exhibit 50?

A These figures have been taken from the reports made by previous witnesses all corrected to the one date, January 1st, 1944, and broken down into the same areas, the sole object being one of easy comparison of the different estimates that have been submitted.

MR. CHAMBERS: This is the only examination I can make of this witness at this stage.

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CROSS-EXAMINATION BY MR. STEER:

Q Mr. Stevens-Guille, what would you say as, - you may have answered this, but what do you say as to the possibility of crude oil wells operating at a 250 pound closed-in pressure?

A Well that is a question that I am only familiar with in a rather more general way.

MR. BLANCHARD: Is that the gas, Mr. Steer?

MR. STEER: No, the crude oil, the crude oil wells operating economically at 250 pounds closed-in pressure.

MR. BLANCHARD: Produced as oil wells?

MR. STEER: Oh well, operating, will produce anything, to operate economically and I take it that means that a man who is in the business making money out of the production of a well would operate.

THE WITNESS: Well as I started to reply, that is a phase of the operations that I am only familiar with in a more general way and there are obviously many factors involved in the economic operation of a well and I do not think that you can make a generalized answer because those factors will vary from end to end of the field according to particular circumstances and the operation of each well or conditions and also according to the general system of producing the well, whether it is done by a small unit or whether the well is one of a large Group of wells operated by one operator.

Q MR. STEER: Should I have asked Mr. Connell that question?

A He is more familiar with the operating conditions of the wells.

Q I see. In any event we have been furnished this morning with this statement and Mr. Connell put a foot note to the effect that "It is my opinion that it will not be economical to produce the crude wells down to a reservoir pressure of 350 pounds", - would you care to give us your comment on that?

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A As I have just said, Sir, I am not as familiar with the operating conditions of the wells as Mr. Connell is, that is his field and I have not studied the point as he has.

Q Now on page 2 of Exhibit 47 you state the estimated market, - perhaps you will tell us what figure you used "At the average estimated market this will provide a source of supply for some 31 years", will you tell us the figures you used for that?

A Do you mean year by year or the actual average figure?

Q I think perhaps we had better have it year by year?

A As I mentioned at first, as I went along, that is the subject of a subsequent submission, what the actual estimated market view was but I am perfectly familiar with it if you wish me to give it, to go into it now.

Q So long as we are going to get it?

Q MR. CHAMBERS: Is that there?

A Not in detail, that is only the total and Mr. Steer wanted to know how we arrived at the estimated market in some detail.

Q MR. STEER: Yes, and that is found in your submission M-4?

A That is correct.

Q And that will be dealt with later?

A Yes.

Q I was going to ask you how you estimated the peak load in future years?

A I did touch on that, Mr. Steer. We used load factor diagrams drawn on past experience and when necessary we adjusted them for such changes as had been assumed, such as for example, the ammonia plant being shut down according to the assumption and taking no gas from 1947 onward and we analyzed the load conditions in detail with the use of those diagrams and arrived at the peak load, the duration of the peak load and computed our figures from those bases.

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Q And when you are dealing with "Peaks", as I understand it, you say that the greatest amount that can be supplied through the presently existing pipeline, due to the capacity of the pipeline, is between 80 and 85 million?

A That would appear to be the indicated figure from the experiences of the past winter.

Q Yes. Now there are days when the peak is considerably more than that 80 to 85 million?

A Yes.

Q And in that case the surplus that is required would have to be obtained from Foremost?

A Yes, that is right.

Q MR. HARVIE: That 80 to 85 million, is that the capacity of the pipeline from Turner Valley through to Calgary or is it the whole pipeline system?

A No, the pipeline from Turner Valley to Calgary, including the six inch line that goes to Okotoks^{and} joins the Gas Company's 16 inch line at that point, the 14 inch line which joins the 16 inch line South of Midnapore and the 10 inch line which goes directly to Calgary.

MR. HARVEY: May I just ask another question there, Mr. Steer?

MR. STEER: Yes certainly.

Q MR. HARVIE: Do I understand that the estimated amount of market would include Lethbridge as well as Calgary?

A Oh, certainly. The market is the total amount of gas that we deliver to the Canadian Western System; where they distribute it to is another point that we do not have to take into account.

Q Well part of the peak, if I may use that word would be .

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going to Lethbridge?

A Well you are getting into the mechanics of the Gas Company's distribution system and that is really going a little outside my sphere.

MR. HARVIE: Very well.

Q MR. STEER: There was some evidence given, Mr. Stevens-Guille, that Miracle 3 had been abandoned as a producing well, do you know about that?

A I have no particular knowledge of it.

Q You do not know why?

A No, I cannot say I do.

Q I suppose that is another thing I should have asked Mr. Connell, should I?

A He might know, I do not know. We do not operate Miracle 3, we do not operate that well.

Q What I was interested in is whether we will find other wells that have to be abandoned in the future for the same reason that Miracle 3 was abandoned?

A Well I cannot answer that because I do not know specifically why Miracle 3 was abandoned.

Q You would expect that between now and 20 years hence quite a large number of wells that are producing today would be abandoned?

A Oh I think undoubtedly, some will be abandoned.

Q For various reasons?

A Others have been abandoned already.

Q For various reasons?

A For various reasons.

Q It might^{be}/that all the economic production has been obtained?

A In certain cases, yes.



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Q And there might be operating difficulties which would cause abandonment?

A Yes.

Q In estimating the capacity of your system to meet peaks, would the possibility of the abandonment of some of these wells be considered or would it make any difference?

A By the time the peak load situation becomes acute the crude oil wells will have ^{reached} peak lines, where their volume is an insignificant amount of the total and dependence will be largely on the Royalite gas cap and the wells on the Royalite gas cap, I do not suppose will be abandoned because their obvious function is to supply that gas when it is required.

Q There would not be an operating difficulty in gas cap wells that would lead to their abandonment to the same degree as that, is that what you are saying, as of the crude oil wells?

A Well I do not think there is any cause to anticipate operating difficulties ^{unless} you are referring to liquid loading, is that what you are referring to?

Q I do not know, I just want your opinion?

A Well let me frame my answer this way, I do not see any reason to anticipate mechanical difficulties in the way of casing or anything of that sort in any of the gas cap wells. There is also the question of liquid loading and as Mr. Connell explained yesterday, in estimating the capacities of these wells he took that part into account.

Q Yes. I was interested in your statement this morning that in your opinion there would be no more oil drilling after 1945?

A "In Turner Valley", I should add if I didn't.

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Q Quite so, I understood that. Would you think that all the drilling which is going to be done for the purposes of finally limiting the North end is going to be done by 1945?

A Well, Mr. Steer, the problem there is, the drilling programs change almost from month to month. At the time we started to make these figures up, which was several months ago, the outlook appeared to be that ^{the} drilling as then contemplated would be completed during 1945. Since then there has been a change in outlook but it does not really disturb our figures to any material degree. If there are extensions of the North end for example, if they were made, then of course there would be additional gas available to that estimated on in our report.

Q Yes?

A Which would in part affect the situation.

Q You were giving out some figures on the peak load today during last winter and I should by now know how to transpose wet gas figures to dry gas figures but perhaps you can tell us; you gave us the figure of 97 million 534 thousand through the absorption plan, what would that be delivered into the system as dry gas?

A Well the actual figure, the actual total, gas draw on that peak load day was 80 million 200 thousand, or very close to that figure.

Q I should have asked you this question, Mr. Stevens-Guille, have you made computations of the amount of gas that will saved to the market by reason of the schemes which we are considering?

A Well that can be arrived at from the figures which we have submitted. The schemes bring into the market gas from the



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B.A. and G.O.P areas and therefore the amount is the total of the gas from those areas that would actually reach the market. I have not got that totalled up now, Mr. Steer.

Q I wonder if you would do that for me, give me the benefit of your opinion as to the amount that would be saved, I do not care whether you do it now?

A I will get that.

MR. STEER: Thank you.

Q THE CHAIRMAN: And would there be crude oil gas to be added to that figure?

A That will be crude oil and gas cap gas.

Q But you are getting gas from the North end, are you not, as a result of this scheme which you previously did not get, you looped your line to the North end of the field and put in an extension to the British Dominion and you are getting gas from those areas which you did not get before, is that not right?

A Well of course the collection of gas from the North end was under way before this scheme came into effect.

Q Well it may have been, Mr. Stevens-Guille, but there was a lot of negotiating done before ever the scheme was put into force and I am not going to part with any of my share of the credit for having conserved gas at the North end of the field.

MR. CHAMBERS: I think for the benefit of the witness we should know clearly and have it on the record what computation Mr. Steer wants him to make.

MR. STEER: I should like to get the benefit of Mr. Stevens-Guille's opinion as to the amount of gas that is going to be made available for market as a result of this

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scheme.

MR. CHAMBERS: What do you mean by "as a result of this
scheme"?

MR. STEER: I do not know that I can say anything
more. Perhaps it would be as a result of orders of the Board.

THE CHAIRMAN: Just exactly, Mr. Steer. Not the pious
hope that existed prior to the orders of the Board.

MR. STEER: Now if Mr. Stevens-Guille would choose
to divide it up so as to take care of the situation between
you and him, I would be very happy.

THE CHAIRMAN: We will adjourn for five minutes.

(A short adjournment was here taken)

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MR. BLANCHARD: Mr. Chairman, while we are waiting for Dr. Boomer I might mention this. Dr. Katz has been working on some mathematical computations to try and find a method of estimating the capacity for gas and oil wells and he has prepared some figures for a discussion of the matter which has been passed around to the engineers and suggests that all engineers have a round table conference with him just to discuss the method he suggests with the idea of seeing if it can be developed into something useful for the purposes of this hearing and the suggestion he made was that the engineers meet today after the hearing, and perhaps it would not be suitable for everybody, and I would like to know.

THE CHAIRMAN: Can that be arranged that all the engineers meet with Dr. Katz this afternoon after we adjourn?

MR. CHAMBERS: That is all right so far as Mr. Stevens-Guille and Mr. Connell.

MR. STEER: Yes sir.

MR. McDONALD: Yes sir.

MR. DAVIES: Yes sir.

DR. BOOMER: That meeting will be held in the Conservation Board office, in Mr. Goodall's office.

THE CHAIRMAN: Mr. McCutchin, is that agreeable to you?

MR. McCUTCHIN: Yes sir.

THE CHAIRMAN: Is your cross-examination finished in the meantime Mr. Steer?

MR. STEER: Yes sir, I would like to have an opportunity of putting that question to Mr. Connell later and it is understood that Mr. Stevens-Guille will be good enough to prepare a statement in answer to the question, at least of gas saved.

CROSS-EXAMINED BY MR. FENERTY:

Q Mr. Stevens-Guille, as I understand the situation, Mr. Connell's

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report deals with the actual volume of gas in the field and you endeavoured to obtain the economic marketable reserves, applying certain principles to those figures given by Mr. Connell. And I see in one of the earlier reports M 3, the available markets described. Those terms I take it in your mind are synonymous. I saw a name. I just want to refer to the name. You did have a report of February 1945 in which you describe certain reserves as available market reserves. Is that right?

A That is right, yes.

THE CHAIRMAN: That is computed or arrived at in a manner different to your reserves in your Exhibits 47 and 48?

A That is correct.

Q MR. FENERTY: I take it in your mind the terms are more or less synonymous as available is a thing that can be economically produced. That is what you mean?

A To a certain extent, yes, but it does not follow if it is carried too far, that those two things remain synonymous.

Q We will see how far we can carry on. You do refer throughout in these two reports Exhibits 47 and 48, M 2 revised is 47. The purpose of the report is to show what proportion of these reserves, those are the actual reserves, shown by Mr. Connell are economically marketable, and then you refer in the next paragraph to certain calculations which in turn give the volume that would be flared as uneconomical to gather and so on to the last paragraph on that page. The reserves estimated by Mr. Connell which can be economically delivered to the market. Now I wonder if we are talking about the same thing when we talk about economical delivery and economical gathering and what the economical reserves are. I take it that you are referring to something which can be handled, put in laymen's language, say handled without pecuniary

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loss. Is that a fair definition?

A No I do not think, Mr. Fenerty, that would be a definition to cover the word as it is being used here.

Q You do not agree with that one. Now I took the trouble to look up some of our dictionary definitions of economic position and so on. As I understand it we are now, your Company and those engaged in oil production and gasoline production, they are engaged in commercial transactions?

A That is so.

Q That is right. It is a matter of dollars and cents and my understanding of the economic position of any operation involving dollars and cents is that the economic position is one, to use a dictionary definition, which is maintained for the sake of profit. Would you say that was a fair definition of economic position under a commercial operation. It is a position which must be maintained in order to make a profit or in order not to make a loss?

A That is what is generally understood.

Q This whole thing is bound up in whether or not this thing can be handled without loss?

A That is so.

Q And that is the only thing that can be involved in the economics of the position, is it?

A Well I think if I was to make just a short explanation of the circumstances under which these reports were prepared, Mr. Fenerty, it might save quite a bit of time.

Q Well I tell you, I am going to let you explain this as much as possible to my friend, and I would like to pursue my line of thought a little further and see where I have got off the track.

MR. CHAMBERS: I submit this witness in response to your

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question should be permitted to make his answer.

MR. FENERTY: All right, let him give it now.

A The use of the word "economic" I have thought before might not have been perhaps the best choice. That is rather forcibly brought home to me now. The position we were in was to prepare some estimate of what amount of the total gas that Mr. Connell had estimated would be present down to certain operating conditions, might be brought to the market. The position already existed where certain installations were made, taking the south end of the field first. There were certain installations already installed or being installed at the time this report was made and the same applies to the Gas & Oil Products area. Now it will be noticed that I have not suggested anywhere in this report that there shall be any addition to those systems. It might have been fortunate that it happened that way, but it is a fact that it did so happen that according to my estimated figures the equipment already installed could handle the reserves Mr. Connell had estimated.

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A That is so for what value it might have, I have shown here what those volumes are likely to be. Coming now to the North end it is true that in here, in my report, both Exhibits 47 and 48, I have shown that certain additions will have to be made to the compressor installations to make available to the market a certain proportion of the reserves estimated by Mr. Connell, but that has been done on general lines, and those installations would have had to have been made, if not in exactly the same form and on the same date, they would have to have been made in the course of time in any event, if the market in Calgary was to be continued to be supplied from Turner Valley. I do not claim that I have shown here that the gas indicated to be collected under these systems will necessarily be economic in the sense that the whole system will be one which returns a profit. That is something that can not, in my opinion, be decided at this stage. There are so many other factors yet to be discussed and for rulings to be made on which would enter into the situation before it could be stated in any particular case what profit the system would make over the life of this project.

Q MR. FENERTY: Yes.

A So that it may be that I have misused the word economic in having it at the top of the report at all.

Q I do not think so. I find, and I turn to your report, Exhibit 48, Exhibit 47, page 1, third paragraph, you say - no, wait a minute now. No, Exhibit 48, third paragraph, you say "There will be no economic limit to the life of all wells in the field. The economics of production are governed by several variable factors such as the number of

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wells produced by the operator, the gas volume produced, the amount of attention required by the well and similar circumstances, as well as the price of oil and gas." We are getting right down to it now, are we not? And I take it that you have considered the factors on which the economic production depends when you are going to give us an opinion on the economic production?

No sir. I cannot give you an opinion as to what those prices should be. What we have done here is to show that somewhere between two figures, 311 and 361 billion in our opinion insofar as we can judge from the facts presently known, that volume of gas may reasonably be considered to be gas available for use in the market.

Q Yes, but I may not be satisfied with it, without the proof of it or the break-down, and I am going to get the break-down, because that break-down might have a different meaning to me, and that is the purpose of the cross-examination.

A A lot of these points are not definitely susceptible to proof. They are a matter of opinion.

Q I presume that your opinion is based on such facts as are available to your company, is that a fair way of putting it?

A That is a rather broad way of putting it.

Q Let us get down to a concrete case. You say here in Exhibit 47 that to derive the marketable reserve from the total reserves, consideration had to be given to a great many factors, the most important of these being the estimated operating conditions of wells from year to year, from which the most suitable operating pressures for gas gathering systems were determined, which in turn gave the volume of gas that would be processed by the several plants. Now what do you mean by those several plants? Do you mean

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the absorption plant and the scrubbing plant?

A I mean by each of the gas gathering systems covered in the report, that would be the B.A. gas gathering system and the G.O.P.

Q But you do not process it in gathering it? You put it through your various processes and your scrubbing processes?

A That is right.

Q So that you mean this, those are the only processing plants, perhaps you call them compressor processing?

A No. All the gas that ultimately goes to market has been processed by gasoline plants before it reaches the market.

Q And you had to give consideration to that, I take it, didn't you?

MR. CHAMBERS: To what?

A WITNESS: To what?

Q MR. FENERTY: To the processing and the results of the processing?

A Well I do not follow in which way, Mr. Fenerty?

Q All right? We come to this, "The volume of gas that would be processed by the several plants and the volume that would be flared as uneconomical to gather." Now what yardstick did you have in talking about the volume of gas that is uneconomical to gather? If it cost 2 cents or 2 dollars a thousand, or does it make any difference to you?

A No, I did not have to have an exact figure, because it is quite obvious that if you get a system and you have got a large volume of gas being used, and you would have to instal large increases in it to gather a small additional volume, that is not going to be an economic thing to do.

Q Now let us pursue that for a moment, it may pay to do it

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say at \$10.00 per M. feet, might it not, but it would not pay if you got 2 cents, is that not the fact?

A Oh, that is quite correct. Anything that is mechanical possibly can obviously be done, if somebody is willing to pay whatever the cost might be to do it.

Q Then when you talk about economical production, are you basing that on the existing prices of gas or any prices of gas?

A Well as I have already said, Mr.Fenerty, as far as the B.A, and the G.O.P. systems went, I did not have to take those things into consideration, as it so happened, because the existing installations will handle all the gas I have estimated will be there to be handled for the life of these projects with very very small amounts excepting.

Q Perhaps you and I do not mean the same thing about something that is economical to produce. I do not know how you happen to pick on that, and I do not know why you modify, if it is not based on economics, why you modified the figures in the other report at all, but I suggest to you that you have been called as a witness volunteering information on economic production, and what is meant by it, and if the Board will permit me, I am trying to get the factors, what goes into the production of this gas. Now you did say that you had considered price of oil and the price of gas?

A No sir, I do not think that that is my statement. I say that those things enter into it. They have to be considered and they certainly would have to be considered. If certain prices would be set, undoubtedly this report would have to be revised. This report, perhaps I can remove an idea there, this report does not purport to be a final answer. It is merely a contribution for what it

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may or may not be worth at this stage of the proceedings.

Q All right. Did you give any consideration to the price of gas?

A Well, as I have.....

Q In determining the economics factor?

A As I have already said, Mr.Fenerty, I did not have to give any consideration to it in the case of B.A. and G.O.P., because the existing installations handle the estimated amount of gas and I assumed, rightly or wrongly, that since those installations are in they will be operated. I have said, however, that should they not be operated, the figures that I have submitted will have to be revised. I am not making a statement whether it will or will not, or whether it will be economic or not to do so.

Q But you are telling me now, if I appreciate it, that your figures have nothing to do with the economic production whatsoever. Is that what you are coming to?

A Not nothing to do, because they are related with the situation as it is at present, and those things have been installed and people are operating them. It has been presumed without further knowledge, that they are being operated economically.

Q Now I am going to try to find out from you, as the expert called to give us the economic figures, what are the actual economic figures. I have got you on the stand, and with the permission of the Board I am going to try to get them because I think they are available amongst your company's records. Now have you given any consideration - you have given consideration to the volume of this product we are discussing, the volume of gas that is available?

A Yes.

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Q Have you given any consideration to the values it contains at all?

A What do you mean by the values it contains?

Q What is that?

A What do you mean by the values it contains?

Q Well, as I look at the situation, when you come to something that can be economically dealt with, you have three things to consider. See if you will go this far with me. You have the quantities of the things that you are dealing with; you have the various values in them, what it is worth for some one or other operation or combined values of operations; and you have the cost of handling. Now I want to draw your attention just to a simple operation. We will take say the gold one. I suggest to you that if you have values of \$15.00 a ton, you own gold property or silver property, or any of those, with costs of \$10.00, that is an economic operation to work it. In another property you have gold values of \$7.00 and costs of \$8.00. That is not an economical operation. You cannot handle it as a commercial proposition. You lose money on your product and the economical operation costs more to handle, so that is uneconomical. So that you must, in order to find out whether an operation is economical or an uneconomical operation, you have to find out the values as to the thing anywhere and the cost of handling it. That is just plain commonsense.

A Yes, that is correct.

Q That is correct?

A Yes.

Q I want you to apply that to this. Is there not any reason why you could not use any plain commonsense in the economics

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of oil operations?

A That is what I naturally claim to have done in putting in this report.

Q All right, that is what you mean. Now then, I say it is obvious when you say what can be economic operation there that you have to consider the volume that you have of gas; you have to consider the values in it, just as you do in gold operations, in total as well as the values in it, and the cost of handling those various values and whether it leaves a profit. Is that not plain common sense?

A Yes, but I am not sure that it can be applied quite so easily to what was necessary to do in order to prepare such a figure as this.

Q I am going to get you to tell it, because you volunteered an economic figure and I want you to tell the principles.

MR. CHAMBERS: I don't want to interrupt my learned friend, but I think you are accusing this witness that he has done something he should not have done. He has reiterated that that is not so.

MR. FENERTY: I am finding out what he has done, and I am going to see about it. He has been called to the stand to give an economic figure.

MR. CHAMBERS: That is the point that I am making. I am saying that he did not give an economic figure at all.

MR. FENERTY: Did you happen to look at the cover "Economic Marketable Reserves"? If you can explain that you are good.

MR. CHAMBERS: But I drew attention to what is inside of the cover.

MR. FENERTY: My position is this: I do not care what the witness has done. If he has not done what he

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should have done to get an economic figure, then I am entitled to bring it out in cross-examination and get him to do it for me. I did not produce him. I did not put him in the stand, but I have got him here and I only want to find out an economic figure, what we would agree is an economic principle, and that is the figure I want to get from him. I am not going to let him go because he has not done it.

MR. CHAMBERS: You ask him what figures you want and he will give them to you.

MR. FENERTY: Yes. We will come to that, Mr. Chambers, and I know the answer.

Q Now then, the gathering system presently employed and which will be employed in the future for the gas from the wells down through to the absorption plant and thence the scrubbing plant, first of all comes from the wells to the separator, and then to the absorption plant and then the scrubbing plant; and then the gas from the gas cap will come direct to the absorption plant and then to the scrubbing plant, and so on down. Those gathering systems are used for a dual purpose, I believe. Perhaps I will put it this way. Not used for a dual purpose but there is one gathering system which is used in the first instance for the conveyance of wet gas from the place of production to the absorption plant, is it not?

A Well, the gas gathering system, and there is only one gas gathering system to each set of operations.

Q Well let us get it this way: there is no dry gas in the field except that what is downstream from the absorption plant, is that right?

A No, there is not.

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Q Whether in the first instance the gathering system is used to gather and transport the wet gas to the absorption plant?

A Yes.

Q Yes. And in determining whether or not production is economical from any particular place, you have, I think agreed with me now that you must determine the cost of getting that production, must you not?

A Oh, that comes into it.

Q Yes. And in the case of wet gas production and subsequent dry gas production, there are certain costs bringing it from the wells or from the gas cap through the various processes?

A Yes.

Q And in determining whether it was economical to produce it have you made any provision as between, say, sharing of costs as between the oil and gas, wet gas operations on the one hand and residue gas that is left on the other?

A Not specifically in this report. There is an existing split of those costs in the case of these gas gathering operations.

THE CHAIRMAN: Where is that split, Mr. Stevens-Guille? Is it contained in one of the other reports?

MR. CHAMBERS: It is in the Madison report, I forget the number.

THE CHAIRMAN: It will be dealt with under Items 9 and 10 of the Agenda.

MR. CHAMBERS: Yes.

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Q And talking about the volume of gas that can be economically brought to the market, that is your residue gas I take it, is it not?

A That reaches the market, yes.

Q Yes. That reaches the market. And how long you can continue that operation will depend to some extent on the cost of bringing it to the market, will it not? That is elementary.

A Yes, that enters into it.

Q And the cost of bringing it to the market will depend on how you allocate the cost of gathering.

A That also follows.

Q Can you give me any break-down as to how the costs of gathering have been allocated in order to determine the economic reserves?

A That is covered completely in another submission.

Q That will be covered, will it? The allocation

MR. CHAMBERS: You have the report already in your hands.

MR. FENERTY: I have not gone through them all.

MR. CHAMBERS: The submission M-12. That is not an exhibit.

Q THE CHAIRMAN: I suppose you could not deal with it, Mr. Stevens-Guille, if you wanted to.

A No, sir.

Q MR. FENERTY: Were those allocations considered by you in determining the volume of gas that could be economically marketed.

A No, Mr. Fenerty, as I have tried to explain to you, I went into the thing in every last detail on these points with you some place. I did it along the lines that I have already pointed out to you two or three times, in a general way to arrive at some figure which might reasonably be within the range.

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Q Reasonably be, without reference to price?

A Well, price as we have already discussed naturally will have an effect and a revision of this might have to be made on the basis of any factor that is brought out afterwards in this Hearing. We have entered into a rather vicious circle. There are so many interdependent factors.

Q Now I am going to talk to you about that. Can we say that your figures have nothing to do with the economics of the situation at all?

A I think the question is the use of that word economic, when it is being carried into a great detail so is possibly a misnomer.

Q In any event it has nothing to do with the present price?

A Oh, it is related to the present price because naturally in using my judgment I have started off with the existing situation and that existing situation must have some relation.

Q That is something. It is just the economic production based on say 2 cents at the well head, is it for gas?

A Yes, 2 cents is the price at the well head now. So without stating that all these systems are economic on that basis, there is undoubtedly some connection between that price and the estimate I have made.

Q I was under the impression that engineering was more or less of an exact science, I may be wrong in that. You must have some definite factors some place to make your calculations worth anything. Is that not right. Did you take 2 cents at the well head and if you did not, what price did you take?

A I did not have to take the price at the well head at all to reach this. As I have said here are some existing installa-

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tions. I am reasonable, I think, in assuming that if they are in existence that they are economic. It is not for me to decide whether they are or are not for this purpose.

Q Let me get a few of the things you did not take into consideration. You did not take the present price at the well head. Now you either did take it or you did not take it.

A I did not take it specifically but as I have already told you since I started with the existing conditions that that among many other factors undoubtedly was

Q Did you have any one specific factor?

A I did not have any specific factor.

Q I do not know how to get at this thing.

A I do not know how to explain it to you Mr. Fenerty. I have said and I think it should be clear, I started off with an existing set of circumstances. I have supposed certain factors based on the fact that these things are in operation today. I take it and I have said that there are a great many interdependent and related factors which will enter into the situation, any one of which, any combination of which, may upset my estimate. If you can tell me the answer to all of those factors, I can go away and recompute this and give you possibly the answer you are looking for.

Q I cannot make any change in any factor when you cannot tell me what the factor is.

A Well the factors that have been enumerated, particularly in this paragraph here and are referred to in a great many other places in the report.

Q I wont say name three, just name one and see if I can get one factor that you took into consideration, just in plain English.

A To name one factor is giving possibly unreasonable emphasis

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to one thing and you have just got to follow through to see exactly what effect that has on the whole to give a complete picture.

Q Can you give me one factor in one sentence. Now there is a work of art.

A You have read the factors yourself, Mr. Fenerty, from page 1.

Q Well, give me any one.

A I will give you the first one mentioned there.

Q What is that?

A The most important of theseWell, let me read it from the beginning so that the sense is correct. "To derive the marketable reserves from the total reserves, consideration has to be given to a great many factors; the most important of these being the estimated operating conditions of wells from year to year." That is the first factor.

Q Now then the estimated operating conditions of wells from year to year that goes to volume, does it not, that will be produced?

A Partly and also pressure.

Q Does it go to the expense of producing it?

A Whether a well, you mean, would be economic to produce?

Q To use your own word, yes.

A I mean the expense of producing it. I am not clear to what you are referring.

Q Well now, you are right when you say we are arguing in a circle. It may be my fault, but I am going to take a couple of more minutes. I am going to try and find some of the things you did not consider. You did not make any computation, we will say, based on 2 cents a thousand for that gas at the well head. You either did or you did not. Just tell me.

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A No. I did not specifically sit down and say the gas will be 2 cents at the well head for this study.

Q Or any other specific figure?

A No, I did not, as I have said, arrive at any specific figure.

Q You did not make any computation or any division of expenses of handling this product between the various industries involved?

A No, not specific. But you are leading to a wrong impression by saying these things were not in any way weighed, because as I have said they are all part of the factors that exist in the present situation, and I made my starting point the existing situation today. You cannot take one thing out without upsetting it all.

Q Can I say - I do not mind where I get it as long as I get it - can I say that the existing figures today include the existing price of gas and the existing costs and divisions were all factors in determining this economic reserve.

A Yes, if you add the other qualifications that I have already given you in answers previously.

Q Then I am back to where I started that this basis of the present prices is one of the factors. Perhaps you would like to have some time during lunch

THE CHAIRMAN: I do not want to interrupt but I can see this situation, where the witness says "I find the British American have a system, the G. O. P. have a system and they have been ordered to put those in by the Board. I am assuming that they can be operated economically." He must assume that because he does not know the figures. "Acting on that assumption I say that so many billion cubic feet of gas can be produced from those two areas." Is that your answer?

A That is correct, sir.

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Q Then with relation to the Madison system, as I understand his evidence he says "I did not put down on a piece of paper 2 cents at the well head. I did not put down on a piece of paper so much for gathering. I did not put down so much for transmission from the absorption plant to the scrubbing plant. I did not put down the cost of scrubbing and I did not put down the wholesale price of gas in the City of Calgary. I did not do those things. But I had a Plant and I knew that certain additions were being made to that Plant and I assumed that there would be a well head price. What it might be I do not know, but it might have some relationship to 2 cents per thousand cubic feet. I know that there would be an ultimate wholesale price to the gas company. What it would be I do not know. But keeping in mind the basic prices that exist today and keeping in mind that they will have a proper relationship to prices which will be fixed after all these new installations were put in, I assumed that this new Plant could be operated economically within these limits." But then he says "If the Board fixes a price on any one of those items with which I do not agree, I may have to recalculate all my figures." As I understand it, that is what Mr. Stevens-Guille is saying. Am I right?

A That is very clearly put, Sir. Taking for example something you suggested, if the price in the City of Calgary was set so high that the industries all turned to coal and the load on the City of Calgary decreased, then I might have to recompute these figures on the different situation as it will then have arisen.

THE CHAIRMAN: Mr. Fenerty, in making these remarks

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I do not wish you to understand that I am trying to limit you at all but I have the idea that both you and the witness are talking about different things. Not different things but different conceptions. You are talking about the same things but you have a different conception of the same things.

MR. FENERTY: I have not any doubt about it. It may be my fault, because to me it does not make any sense at all talking about what you can deliver economically. It is just so much talk. I do not know why we are not right back to the original report. There is so much goes through without any modification at all.

THE CHAIRMAN: I can sympathiz with the viewpoint of both of you. I think you will get the detail you are seeking and when you get it, it may upset this witness' figures. He may have to revise his figures.

MR. FENERTY: Perhaps the result of considering my notes would be that I could save more time by asking questions now.

THE CHAIRMAN: I would like to go on a little longer.

MR. FENERTY: Very well.

Q I have gone far enough to know that we completely disagree on economics anyway.

A I do not know that we completely disagree on economics. We disagree with the conception of how this report was built up, Mr. Fenerty.

Q One thing more at the risk of labouring it, did you consider or have you given any consideration to values in dollars and cents of the respective products produced, crude oil, gasoline, dry gas.

MR. CHAMBERS: I think, in fairness to the witness, you should put to him what you mean by values.

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MR. FENERTY: What they are worth in dollars and cents after you get them.

MR. CHAMBERS: Are you using it in the sense of what you do get for them or what you can get for them?

Q MR. FENERTY: Yes, in the sense of what you do get for them.

A As to whether the present values we get for products from Turner Valley today are the correct ones?

Q No, not whether they are correct. But did you give any consideration to the returns from the various phases of this industry involving the handling of this gas?

A No, I did not, in this report.

Q And it follows then you gave no consideration to the apportionment of costs which are common, we will say, to the three in proportion to the returns on them, did you?

A As I have already explained, Mr. Fenerty, this is dealt with in another submission that will be made to you, of which you have a copy.

Q Yes, I see. All right. Now then, in connection with the matter of the peak load. I have heard some evidence, some from Dr. Katz, some from Mr. Davies and there is some, I think, in Mr. Connell's report which deals - I am coming to the gas cap - deals with the capacity to produce at any given time and we heard some evidence from some of the witnesses, particularly Mr. Davies, that in his opinion a situation would arise at some time when the volume of gas that could be obtained under the Brown Plan or any increasable allowable under the Brown Plan would be insufficient to meet the demand. You remember that, don't you?

A We have also covered that in our report. It is quite definite that such a condition will arise.

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Q The suggestion there was that no increase in the allowable under the Brown Plan would meet the situation because the wells would not have the capacity to produce even to the present allowable of the Brown Plan, do you agree with that situation?

A We have stated, I think, the same thing and that is that the capacity of the gas cap wells to produce under conditions that we have estimated will exist in the gas gathering systems will be too small to supply peak loads to Calgary after a certain lapse of time.

Q Yes.

A I think that that viewpoint is in complete agreement with Mr. Davies' evidence and Dr. Katz.

Q But you do postpone that time by - or you suggest the postponement of that time by increasing the allowable under the Brown Plan, don't you?

A No, sir. That we have suggested should happen, true enough. But it still does not answer the point that I thought you had in mind and that is the fact that the day will arrive when the gas cap wells will not have the capacity. It is not a question of the Brown allowable or any other allowable. They physically could not produce sufficient gas to meet the market demand.

Q Perhaps we are agreeing. I thought you suggested in one place that it might be necessary to increase the Brown allowable.

A We do very definitely but that will be something that will occur at an earlier date. Then the time will come when a new condition will arise when a well will not have the physical capacity irrespective of what allowable might arbitrarily be given it.

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Q I see in your table 3, revised, in this report 27, rather Exhibit 47;

"Estimated Brown allowable to 1957 inclusive, from 1958 onward, Brown allowable insufficient to supply market therefore assumed full requirements of market would be withdrawn"?

A That is correct.

Q Now does that take into consideration the capacity to produce at that time?

A Very definitely. We covered that at some length both in the narrative and in the discussion and Mr. Connell, as you will remember, described to you certain graphs which he had drawn up in order to make estimates of what those capacities will be under certain reservoir and operating conditions.

Q Well I want to turn for a moment, I am just asking for information here now, to Mr. Connell's report, Exhibit 44, and you will see at page 104, you see calculations there at the top-hole pressures of 325 pounds and 220 pounds and, well operating pressures at 100 pounds, will you look at those figures?

A 350 top-hole pressure, did you say?

Q 350 top-hole, 325 rather and 220?

A There is no 325 here.

Q 345 and 220, I am looking at two different columns, I am sorry, that well operating pressure at 100 pounds?

A 345 top-hole, yes.

Q And you have with 345 pounds 90 million cubic feet?

A That is correct.

Q And when you get down to 220 you have 38 million?

A 220 top-hole down to 38 million, with a well operating

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pressure of 100 pounds.

Q Now those figures were carried out to those results because I suppose it is assumed that these situations will be arrived at in the course of these operations, is that right?

A Yes, that is correct.

Q So that, now these figures, the 90 million and the 38 million, those are the figures which show ^{the} /capacity to produce, are they not?

A That is right.

Q And you deduct from them in each case your $17\frac{1}{2}\%$ for conversion, scrubbing and so on?

A That is right.

Q That is right, and in the case, I think Mr. Connell told us, of an extremely cold spell over a week we will say, you might have, he estimates a fair figure for liquid loading will be 10%?

A That is correct.

Q So that you get down to a situation where that 38 million is reduced by something less than one-third?

A That is right.

Q So that you are going to get a situation along at sometime, when your gas cap production is going to take care of a fraction of the peak load?

A That is correct.

Q Now have you any estimates or can you give me any estimate as to what time you expect to arrive at the 220 pounds?

A Well that is mentioned in both the reports.

Q Yes, I know, but I wondered if you could give it to me? You can figure it out quicker than I can?

A That is stated in report Exhibit 47, estimate that the

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market can be supplied until 1968 by the gas cap but by that year the capacities of the gas cap wells will have decreased to the point at which peak winter loads can no longer be met.

Q Your figures are correlated to these figures?

A Yes.

Q MR. BLANCHARD: That is the revised?

A That is correct. It of course occurs at an earlier date in Exhibit 48, M-2A, because there is less crude oil gas used in the market according to this estimate and therefore the withdrawals of the gas cap begin at an earlier date and there it is predicted to occur in 1965. It should have been actually 1964.

Q Now I do not want to take too long but perhaps you can help me on one question here before I stop; we can perhaps agree that it would not be an economic operation to take gas or to install equipment and take gas from another area to supply a few million feet a day for a few days in the year, that is obvious is it not?

A Well you say "for a few days in the year", of course it comes down to a question of how many days in the year and what the total would be.

Q What I am getting at is this, sometime, sooner or later, we are going to come to a situation where the peak loads cannot be supplied from the Turner Valley field or a combination of the Turner Valley and Foremost fields, will you say that?

A Yes, the time will undoubtedly come.

Q And I suggest to you as a matter of economics when that time comes you have to get more of your peak load some other

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place if it is available, you have to get more than the amount you are short from some other place?

A Well I think that rather turns on what you mean by "peak loads". If the loads will, the amount which you will have to obtain from some other source/^{to}supply the peak loads will increase rapidly over a period of quite a short number of years.

Q Yes?

A Therefore the load on the equipment of some other field will be gradually getting better, that is to say the loading factor will be nearer to the capacity.

Q Yes?

A The exact economics in these things is something/^{which}you would have to work out knowing all the facts.

Q But it is obvious, is it not, that if there are other fields available, as soon as you have to go to them for any portion of the load, in order to make it an economic operation, you have to go to them for a substantial portion of the gas market, that is what I am trying to get at?

A Well of course in looking forward to that day, Mr. Fenerty, consideration must be given to the fact that a new source, whatever it may be, is going to look forward to supplying an increasing portion of the load as the years go on.

Q Yes?

A And in balancing these situations that undoubtedly has to be taken into account.

Q You do not believe in the theory of paying as you go?

A Well, paying as you go is not just a question of paying for a supply as you go and the supply being taken from more than one source, - it so happens around here we are

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taking it from one source primarily but if you look at the setup in many of the towns in the States you will find there are three or more sources for one place.

Q Perhaps it is a matter of argument anyway. Now one thing more and I am finished, my understanding of Dr. Katz' evidence was that he arrived at the gas cap reserve of 168.7 billion down to a figure of 100 pounds of bottom-hole pressure, I think that is correct, and you arrive at a figure substantially in excess of that at 195 pounds bottom hole pressure?

A Yes, a 195 pounds is the bottom-hole pressure that we estimate will exist at the time we have arbitrarily cut off the operation in our report.

Q And all that means is you just do not agree on the reserves, is that what that means?

A Yes, there is a difference in the estimate of the reserves.

Q And it follows if you are too high he is too low, or rather if you are right he is too low?

A Yes, I think so, if there is any difference there.

MR. FENERTY: Now before I leave this, Mr. Chairman, I do not pursue these matters further because I agree with the view of the Board that we are talking about different things but I do not think we should be and I do not want to close this examination without submitting that at some stage, as a result of this witness being put forward to give economic figures, that I should be permitted to attempt to obtain from him, - even although he has not considered them, - not only the figures that my friend says are in that report showing allocation of costs but I submit the allocation of values, and values of the operations as

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being the real test in an arbitrary allocation of costs, but the real test does involve the profits and the net results and so on and merely for the record I am going to ask the witness to let me have those figures.

MR. CHAMBERS: I am not quarrelling with my friend at the moment but I understand all he is saying he is reserving the right to attempt to try to get these figures. He can try what he likes.

MR. FENERTY: I am putting it in the form of a formal request now but I do not expect an answer.

MR. CHAMBERS: A formal request for what?

THE CHAIRMAN: Gentlemen, the position is this,- Mr. Stevens-Guille was unable to give specific figures on which he based his economic estimate. Submissions are to be made by other witnesses submitted by either the Madison Company or Royalite. If those witnesses are unable to give Mr. Fenerty the information on the economic problems which he wants then he can ask me to have other witnesses called, which I will do, and they will produce whatever records may be necessary to give the figures which are wanted.

MR. CHAMBERS: As I understand it, my friend is just saying because he does not pursue the examination of this witness any further, that that in itself does not preclude him from asking for these figures.

MR. FENERTY: That is it.

THE CHAIRMAN: And I want to add to that, if at that stage Mr. Fenerty again desires to cross-examine Mr. Stevens-Guille he will be at liberty to do so with reference to the information which he has obtained.

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MR. FENERTY: All I want to do is to leave it open because it may be that no other witness will attempt to give us the economic reserve.

THE CHAIRMAN: Now I do not want to limit anyone, Just a moment, Dr. Boomer did not catch what you said just then.

MR. FENERTY: I said I wanted to leave the examination open, as not completed, because it may be that there will be no other witness who will attempt to give us the economic reserve.

THE CHAIRMAN: Now without attempting to limit anyone, and I can assure you there is no wish to limit anyone, can you give me any idea how long you will take, Mr. McDonald?

MR. MCDONALD: Possibly half an hour.

THE CHAIRMAN: Mr. Harvie?

MR. HARVIE: I will be quite short.

MR. CHAIRMAN: Mr. Blanchard?

MR. BLANCHARD: Ten minutes, I think Sir.

THE CHAIRMAN: I have to leave for a little while this afternoon. I have another case that I have to take, which was arranged before we knew we were sitting this afternoon but Dr. Boomer will carry on while I am gone.

MR. STEER: Perhaps if we went on until half past one we could finish.

MR. CHAMBERS: I have an engagement at one.

THE CHAIRMAN: All right, we will adjourn until 2 o'clock.

(The Inquiry was here adjourned to be resumed at
2 p.m.)

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CROSS-EXAMINED BY MR. McDONALD:

- Q Mr. Stevens-Guille in Exhibit 47 you refer to installation of additional suction compressors in the north end. I think it is on Page 3, Madison Compressor Station No. 1. How soon will the installations be completed to bring the suction pressure down to 200 pounds per square inch?
- A The equipment has been partially delivered in the last two or three days, completion might be expected in the course of the next month, so I would say in the matter of six weeks to two months anyway at the outside it should be.
- Q Then a number of wells will come on to the gathering line that are not now connected up?
- A Well I have not made any very recent survey of how many will come on. It is a matter I believe of four, five or perhaps six at the outside at the present time.
- Q I think last May you told us that the required pressure at the north end of the line was 330 pounds to intake?
- A That is what it is about 330 to 350 on the average day's operation.
- Q By reducing the suction pressure at Madison No. 1 station to 200 pounds what would be the intake pressure at the north end there?
- A It won't get quite the full benefit of the 40 pounds reduction. It will be in the neighbourhood of between 30 and 35 pounds at the far end. Of course, now we are moving, do not forget, into the summer condition of operation and the pressures on the north end of the line tend to decrease in any event because the gas cap gas is not travelling in the lower or plant end of the line. It is merely crude oil gas travelling in the system in some of it.

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Q Referring to Page 5, of Exhibit 47, to second paragraph where it is referred to "Then the allowable will remain static and hence the Brown allowables". Just what do you mean by static?

A Well the whole assumption in that paragraph was made in order to be able to handle the mechanics of that Table 8 we were looking at this morning, and we had this condition to meet. At one point or three points close together in the gas cap we were proposing to put gas back. At other points during part of the year it was going to be necessary to withdraw gas. We needed to know what the Brown allowables would be to compute the sharing of the market, of the Royalite gas cap, along the lines of the proposed share position method that we have put out in another Exhibit. We therefore had to make an assumption for the purpose of that calculation and we simply made the assumption as stated there that as long as there were no net withdrawals the pressure in the reservoir would remain static and hence the Brown allowables computed from that pressure would also remain static. It is just an assumption for the purpose of being able to mechanically go ahead and determine those figures which we needed.

Q Did you have in mind this there is the present Brown allowable for the gas cap area 1945 allowable?

A Yes.

Q Now will that allowable remain exactly the same as the same thousand cubic feet per well through to 1947 or annually will there be tests made of each well and a recalculation of the Brown allowables made?

A We were not of course considering what should be done to control it. We were merely arriving at some estimate to handle the figures for this particular report. This does not claim

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to be a suggested method of doing it. It is merely a mechanical method for arriving at a figure.

Q But what I had in mind, the Conservation Board will, to be consistent with your actions, consider all the characteristics of each well and its allowable for each year and it may vary, maybe not a great deal, but some. Would that still be consistent with your estimates?

A According to our assumption here, yes.

Q That is what I want to know. It is not simply taking the 1944 Brown allowables and saying that is the allowables for that well right through to 1947?

A No it is an assumption simply to produce this long before such matters as that come to be decided.

Q So it is not a question of freezing the Brown allowables of 1945 and keeping them until 1947?

A No.

Q Then going on to the next line in the same paragraph. I take it to mean in the event the allowable is decreased?

A Not in the event the allowable is decreased. We have decreased the allowables for the purpose of making this study in order to arrive at these figures. We are again describing what we did do. We are not making any statement as to what should be done. It is merely the mechanics of handling the figures.

Q This calculation that you describe applies to those years in which there is more gas withdrawn than stored?

A Yes that is the condition that we have reached.

Q Refer to Table 2 and point out a year where that occurs?

A I did not hear the last part of your question.

Q Would you point out an instance where the withdrawals exceed the storage on Table 2?

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A Well following down in column 3, which is headed "Net withdrawals", the first figure against 1945 is, 9,228,000,000. That was the net withdrawal from the gas cap. In 1945 the estimated net withdrawals are shown at 242,000,000. In 1946 the net withdrawals are preceded by a negative side. In other words in that year there will be more gas stored than withdrawn. And in the next year the same applies in a larger quantity and then in the succeeding years gradually the picture changes again and the amount stored begins to approach the amount withdrawn until you get down to into 1951 I think it is, yes, when for the first time again you withdraw more than you store.

Q Then I understand the allowable is decreased, using the relationship shown in Graphs 2 and 5, 76, 77, 78A, 79A of Appendix of Madison 1. Now can you illustrate just what you mean by decreasing the allowables?

A Yes, we have assumed that the total Brown allowable for the Royalite gas cap will be some figure lower than for the preceding year and we have done it on the basis of the relationship shown in those Graphs, which are quoted in the paragraph that you referred to. I do not know whether it will clear the point up at all Mr. McDonald, if I were to say that this is not a scheme along which we are suggesting these things should be produced. This is just a device for arriving at the figures ahead of time in order to be able to produce the report. They are two rather different conceptions there. I do not know which one you may have.

Q Well if a different scheme should be followed, say in 1954, would it change the application of your report very much?

A Not the application. It would change the figures possibly according to how much the scheme was at variance with our

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estimate of what the productions would be. It does not change the application. The same method of setting up Table 8 could be gone through. It merely means a revision of Table 8.

Q Of the different figures in it?

A That is right. That incidentally is one of the prime thoughts we had in mind in arranging the set up of these reports that they are open to being changed quite readily, and when I say quite readily there is a lot of mechanical work in it, but from the point of view, if one factor is changed, its influence can be gone through and determined on the whole picture.

Q On the same page, Mr. Stevens-Guille you referred to^{the}, that is Exhibit 47, fact that the Brown allowables will be insufficient to meet the market requirements in 1958?

A Yes.

Q And then you assume that the market supply withdrawn from the wells would be with regard to the Brown formula?

A Yes.

Q Now in the next paragraph you suggest that the new wells may be drilled and in that way the supply will be increased and the Brown allowables may still apply. Do I understand that?

A For a short further period of time.

Q I was interested in your difference with Mr. Davies in regard to that. I read his report suggesting that these new wells will be required in 1955 and 1956?

A As against our 1958.

Q Yes.

A Well I do not think there is a very large discrepancy there. We certainly are not going to claim that our estimates on a point like that are going to be right within possibly one or two years.

MR. DAVIES: And I do not either, sir.

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Q MR. McDONALD: And if you refer to Table 4, in the same Exhibit 47 dealing with the years 1950-1-2-3, you have your percentages of gas flared increased in the neighbourhood of 21, 22, and 24%. Have you any particular explanation for that sudden increase in those years?

A Well you will notice in columns 3 and 4 there is also an increase and decrease in the amount of crude oil gas produced, that is only 9.4% going to 12.3% where the amount we have estimated to be flared has gone from 14.2 to 21.4. That is the point you are referring to?

Q Yes.

A Going back to column 5, you will notice that the volume we have estimated will be flared is not in itself a very large volume. The production of the wells has declined, the total handled by the station will be less and in our estimate it would not be - I was going to use that word "economical" - but I hesitate and say but would not be worth while if that is an essential word to use, to collect or gather and you will see as it goes down that percentage does not rise very much and the volume does not increase very much during the next few years. Therefore if the increased capacity had been put in, that increased capacity would have a very poor load factor. It is in part, on those grounds that we do not think that volume of gas will be gathered when the time comes.

Q One explanation that has occurred to me was that maybe a number of wells that have been discontinued in that area at that time. Did you have that in mind rather than annual decline of the wells that were connected that you had in mind?

A Well this as you will realize is based on those tables included in Mr. Connell's report and it means that a certain number of wells connected to this plant have reached the operating

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pressure which according to his estimate will be too low to enter the gas gathering system at the pressure we have suggested here which is 40 pounds at that time suction pressure at the station, which means pressure of between 40 and 60, probably at the various wells connected.

Q Now dealing with the British American gas gathering system, page 8. Do I understand that it was your assumption that the gas cap wells in the British American area would be operated under the Brown formula from time to time. That is the wells would be given the allowable each month as followed by the Board?

A Actually at the time this report was in the course of preparation it was assumed that the British American gas cap wells would produce the Brown allowable daily. Now it is quite possible that arrangements might be made for those wells to produce the Brown allowable on an annual basis as I think you are suggesting and it would make some change in the daily picture but it would not alter of course the reserves or the annual picture that we have shown here.

Q And the static condition that you applied to the Royalite gas cap wells would not apply to the British American area?

A Oh yes I think if you will turn to page 9.

(Go to Page 1246)

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- Q Going to Page 9, the last paragraph, you say "In estimating gas cap allowables for this area the same assumption has been made as for the Royalite Gas Cap, namely, that the pressure of the gas cap as a whole will remain constant as long as the cumulative withdrawals from 1945 do not exceed the cumulative volume stored".
- A That is on the same assumption, and made, of course, for a similar purpose, merely to be able to proceed with the mechanics of compiling the report in this manner.
- Q Now in referring to paragraph (f) at the top of page 8, Mr. Stevens-Guille, there is a $2\frac{1}{2}\%$ of the wet gas produced by the wells connected that is allocated to pull-downs and is that included in the 20% figure or is it added in to make $22\frac{1}{2}\%$?
- A Added in to make the $22\frac{1}{2}\%$.
- Q Yes. Referring to Table 8, in Column 2, the total residue gas, I think this morning you stated that you had worked out the percentage factor for each of the different systems, that is, the Madison, G.O.P. and B.A. systems, in reducing the wet gas to residue gas. Can you give us those factors?
- A Well we were just discussing the one, that was the B.A. That is the one given there in Item (f) on page 8.
- Q $22\frac{1}{2}\%$?
- A Yes, that is right. And on page 10, Item (d), towards the bottom of the page, we state that 30% of the gas processed would be consumed in gasoline plant shrinkage and fuel, and that was used, the assumption that was used for the Gas & Oil Products and for the Royalite gasoline plant, we used 15%, and for blowdowns and pulldowns on that system we used $2\frac{1}{2}\%$.
- Q Now in Item (d) on page 10, referring to the Gas & Oil

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Products, you have 30% plant shrinkage and fuel, and the fuel for the refinery would be included in the market. That would mean that the fuel for the refining is not included in the 30%?

A That is correct. Excluded from the 30%, and appears quite separately in the estimated market.

Q So that, shall we say from an efficiency standpoint, the relative efficiency of the different systems with respect to the amount of wet gas produced from, that is the amount of gas available for market, there is the Royalite plant 17½%, B.A. 22½%, and the G.O.P. 30%.

A Yes. There is one word to add to this. Of course we took those figures of 20% for the B.A., and 30% for the Gas & Oil Products from data previously submitted to the Board, and we have superimposed the 2½% for blowdowns and pulldowns and we have consolidated it in the other 30%.

Q Now would the efficiency of the operation of the B.A. plant through installations of some kind, if there is some improvement, there would be a reduction in those?

A Well I do not know that you are necessarily completely correct when you use the word efficiency. If you use the word shrinkage. They are operating under different conditions and I am not fully conversant with all those conditions. But if the shrinkage is deducted for the volume lost in processing, and also used for plant fuel was less, then what you state would be true.

Q Now if you turn to Exhibit 48, Tables 8 and 9, Table 8 and Column 18, you give the total of gas stored which is at the bottom of the page as 23 billion, 415 million cubic feet.

A Yes.

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Q Now on Column 17 of Table 9, you have a heading "Plus Gas Stored in B.A. and Royalite Gas Cap", and your total, as I read it, is 16 billion, 200 million. Could you reconcile those two figures?

A Yes. The difference in those two figures is that the one on Table 8 includes what is going to be stored in Bow Island, and that then has been moved out of the area and is in a reserve in another place, therefore we have not taken that into account in Table 9 as a Turner Valley reserve because it is no longer properly such, and also there is, of course, the proportionate loss of reprocessing that gas to the market. The gas I am now speaking of that is stored in Turner Valley.

Q Now if you refer to Table 8, as I read the Table, Mr. Stevens-Guille, if there should be any reduction in the Royalite Gas Cap allowable say in the year 1946, so that instead of having the production available of 8 million cubic feet, wet gas available, it should be down to 6 or 5 or something of that kind, there would be no change in the distribution of your marketable gas except that you would have less gas conserved?

A Yes, I think that follows.

Q I mean there would be no change in your repressured gas because that is dependent on the crude gas available?

A Yes, that is correct. Of course, I do not think that the suggestion of going down to as far as 6 is anything other than an illustrative figure, because I do not think it is a possibility in 1946.

Q That is all.

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CROSS-EXAMINATION BY MR. HARVIE.

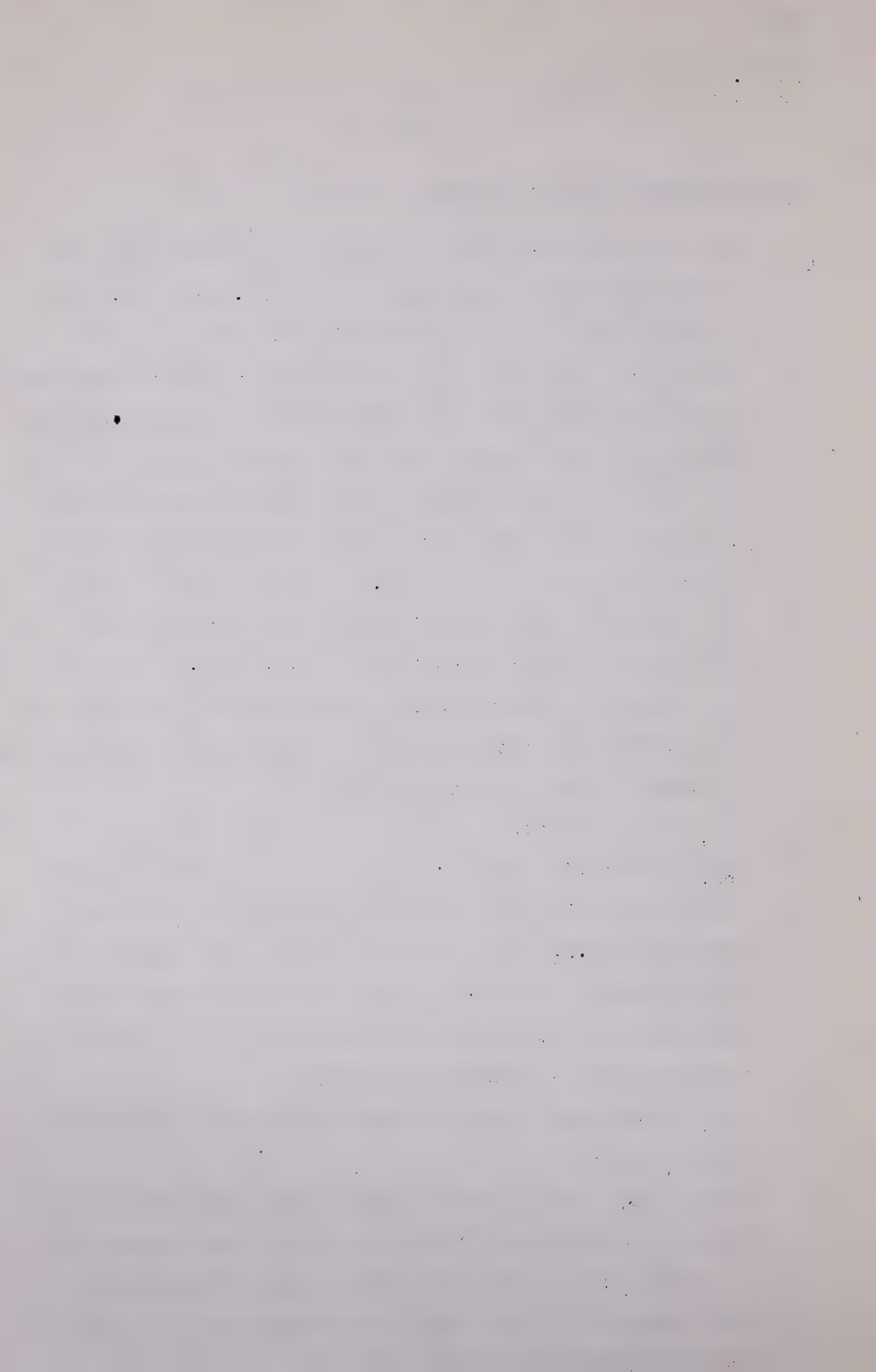
Q Just one point, Mr. Stevens-Guille, that I would like to clarify which was touched on in part by Mr. McDonald, and referring again to page 9 of Exhibit 47, which is your report M-2, where you say "In estimating gas cap allowables for this area the same assumption has been made as for the Royalite gas cap, namely, that the pressure of the gas cap as a whole will remain constant as long as the cumulative withdrawals from 1945 do not exceed the cumulative volume stored," and then it carries on. And in Table 2 of the same report in Column 10, it gives the net cumulative withdrawal from the gas cap into the B.A. area. And you take the year, possibly 1950, I believe it is, to show that the net cumulative withdrawal as a result of the repressuring is minus 4 billion as of that date?

A Yes, that is correct.

Q Now, in Dr. Katz' evidence he gave us an estimate in his evidence of March 14th, that an injection of $2\frac{1}{2}$ billion feet into the B.A. gas cap would increase the pressure of the gas cap by 30 pounds. Just in round figures, would that mean that a four billion injection as of that date would increase it possibly 50 pounds?

A Yes, if the first figure is right, the second figure would follow from it.

Q Then on that basis, I would like to just thoroughly understand what you have in mind when you make your assumption on page 9, I will put it in this way, that with the 50 pound increase in that year, and it would give that increase in bottom hole pressure, would it give to an increase allowable?



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A In actual practice that might well be. We merely use this as a simplified device for getting our figures collected.

Q I wanted to make sure of it.

A We are not laying it down as a principle to be followed.

Q DR. BOOMER: You do not know what the Conservation Board will do?

A That is true.

Q MR. HARVIE: And that is no suggestion that that be followed by the Conservation Board?

A No, it is a mechanical device to compute these figures without having to go into the tremendous detail to arrive at the answer, and we think we are close enough to the answer in simplifying it in this manner.

Q That is all, thank you.

.....

CROSS-EXAMINATION BY MR. BLANCHARD.

Q Mr. Stevens-Guille, about peak loads, do I understand that whatever the peak load might be, that is, the peak load for the Gas Company, that Turner Valley can only furnish, that the capacity of the lines from Turner Valley are limited to 85 million cubic feet a day?

A Well that appears from the experience of the last winter to be approximately what the maximum capacity would be.

Q Yes. So that as long as you can furnish 85 million cubic feet a day, that is for the peak loads, that is all that this Turner Valley could furnish, no matter how much gas it had?

A That is correct, under the present setup.

Q That is correct under the present set-up.

A Yes. If it became desirable that could be increased of course,

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Q Now then, it may be, and we have no figures on that yet, but I believe Mr. Steer is going to furnish them, it may be that the peak load for the gas system exceeds 85 million, or exceeds by some substantial amount the amount that can be furnished by Turner Valley, and that is furnished from Foremost, I think you said?

A That has been the practice.

Q And what about Bow Island, can that gas there be used for peak load purposes?

A Well I have some knowledge but I think actually, Sir, it is really outside of my sphere to make statements as to the set-up at Bow Island.

Q Well it is Turner Valley gas that is going there and I want wondered whether that was going to take care to any extent of the peak load. It would have some bearing, I suppose, on the eventual ability of Turner Valley gas to meet peak loads if part of it is in Bow Island, and can be used for that purpose?

A Well I think the Gas Company would probably be in a better position to give you the correct details as to how Bow Island and Foremost are correlated into their system.

Q Yes, all right. Now you base your peak load factor charts on the detailed figures you have for 25 years?

A That is correct.

Q And have you there the figures before you?

A No, I have not brought them in.

Q They are not here?

A No.

Q They could be furnished?

A Yes, they could be furnished.

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Q I thought it might be of interest to the Board to know what the experience has been over the last say 10 years, and for what periods these peak load requirements last on an average in each year, or over a period of years, because you would have to take an average of some years?

A You have to take several factors into account in preparing the peak load diagrams to use for the present conditions, and of course again, as I mentioned, for the future conditions that are being predicated. An example I give was if the Ammonia Plant no longer takes gas.

Q Yes. Now your estimate in both M-2 revised and M-2A for the gas cap is down to about 190 pounds bottom hole pressure?

A That is correct.

Q And that bottom hole pressure is average pressure over the undrilled acreage as well as the drilled acreage?

A That is correct.

(Go to Page 1253).

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Q So that taking the wells as they stand now, those wells that are drilling now and leaving out of contemplation the drilling of additional wells, your bottom hole pressure which would be producing those wells would be - that is bottom hole pressure at the wells would be somewhere in the neighbourhood of 100 pounds, I suppose.

A The bottom hole pressures of the wells actually at the time they were being produced?

Q Yes.

A It would be down towards that figure. Whether it would be quite as low as that I would not like to say for certain.

Q The point was the 190 pounds is not your bottom hole pressure at the wells?

A No.

Q It is the bottom hole pressure averaged over an area of 2600 acres and based on, I assume, higher pressures in that area.

A Yes.

Q So your estimates, I want to be clear on this and you have already probably covered it, and I have missed it, your estimates towards the latter end of the life of this field depend on your actually drilling some six more wells in the gas cap area do they?

A No. We have shown how with our estimates of the capacity of the drilled wells

Q Oh yes.

A We could supply the market. Our only reference to drilling further wells was to delay the day when the peak load would have to be met from some other source than Turner Valley.

Q That being the case, it might be if need arose and the cost

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were not too high that the peak load problem would be met for a few years longer.

A That is correct.

Q But have not been taken into consideration in the present.

A No.

Q Now in M-2 (Revised) you base your figures on Mr. Connell's, that is the production in the oil area down to a tubing head pressure of 75 pounds or the production of oil of 10 barrels a day whichever is the later?

A That is correct.

Q Now just to be clear, that tubing head pressure factor does not apply to the B. A. area in your computations, or does it?

A Yes, it was carried down to the same point over that area as well as over the G.O.P. and Madison areas.

Q You put it all on the same basis.

A That is right.

Q Having regard to the low pressure system installed in the B. A. area, do you consider that a proper basis?

A Well, the difference would be very small because as can be seen from the tables here all the B. A. area by that time, the volume that will be produced according to our estimate is very small so that it would not appreciably change the life of the project as a whole.

Q I understood that these wells in the B. A. area could be produced under a suction pressure of practically zero. That would mean a tubing head pressure of say 10 or 15 pounds.

A Well that might be correct, but I do not think that the difference in the figures would alter the picture as a whole to any appreciable extent.

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Q- In any event you have used the same factor throughout?

A That is correct.

Q Irrespective of whether it is a low pressure system or not?

A Yes.

Q Now taking your M-A, which brings your oil area, that is the production of gas in the oil area, brings it to abandonment at a time when a well ceases to produce 10 barrels per day, it has been put then simply on the economic basis - I should not use that term - of whether it pays the oil operator from the standpoint of producing oil.

A That is correct.

Q It does not take into account at all what the production of gas may be from those wells?

A Not that report in itself, no.

Q In other words, I think it is true and I think Mr. Connell said it was so that a great many of the wells in the oil area, after they are through producing oil, will be very good gas wells.

A They will be delivering some gas but the quantities will not be, as those figures here show, very large in relation to the whole. A study of the total of the wells connected to this plant in the declining years would indicate that very clearly.

Q My understanding was of what Mr. Connell said, and I may have misunderstood him, was that some wells long after - he perhaps did not say this exactly - but long after they have ceased to produce as much as 10 barrels a day, may be producing a very large, or capable of producing a very large volume of gas. Now then, if that is so, you are leaving a lot of good gas wells behind on the basis of your estimates in 2A.

A Well I think the use of a very large volume of gas is

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possibly not the impression he intended to convey, Sir.

But of course the reason, one of the reasons why we have cut them off in this report at 10 barrels a day, is to take into consideration this probable problem of liquid loading. While some of these may be produced after that time, some of them may not and that cut-off point is used to try and arrive at some common average figure for the whole field's operation.

Q Well is it true generally that wells that have been good oil wells, after they have ceased to produce oil, may be as good wells as gas cap wells as gas producers?

A By "as good" you mean as large producers of gas as some of the gas cap wells?

Q Yes.

A Yes, some of them may produce as much gas as some of the gas cap wells but that does not necessarily insure that they will continue to operate. There are other factors which will enter into that.

Q Suppose after these good gas wells in the oil area cease to produce oil and suppose they were shut-in, like the gas cap wells, until they were required for the latter end of the field, would not they contribute a good deal to meeting the peak load?

A When they would be shut-in?

Q Yes, not produced.

A Well of course if they are shut-in somebody has got to take care of the cost of keeping those wells shut-in.

Q You are not producing them anyway after they cease to produce 10 barrels of oil.

A But wells, when they are abandoned, sir, are not necessarily left in a condition to be re-operated.

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Q They can be maintained, can they, or can they not?

A Oh they no doubt could be maintained but that has not been considered here. What we have considered here is between these two different points of cut-off and we have stated that somewhere between those two points will probably lie the amount that can be obtained.

Q Well yes, and it is more likely to be above 311 billion at the end.

A Yes. Definitely that. We say it will lie between 311, or about 311 and below 361.

Q This liquid loading, which seems to be a very grave problem, when wells become loaded with liquid they can be dealt with by blowing the liquid out.

A That is the present practice.

Q And because a well becomes subject to liquid loading it does not mean it is through at all?

A Oh not, it can be unloaded and will then continue to produce gas.

Q And perhaps produce more than it did before?

A It will produce more than it did immediately prior to being unloaded, because the differential pressure is going to be greater.

Q That liquid loading can, to a certain extent, be dealt with in any event and that does not necessarily end the usefulness of the oil area?

A No, it may become an increasing problem as pressures decline, and that is a problem that between now and that date undoubtedly needs some consideration.

Q Have you made any rough estimate of the number of wells in the oil area that will become outright gas wells as contem-

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plated in the Brown Plan. That is over 30 million cubic feet?

A No, sir, I have not.

Q In your Table 1 in M-2, first in 1945 I see you have under column 5 volume flared producing pressure too low to enter system. That is in the Madison gathering system No. 1 and you have 1,910,000 a day. Now my information, furnished by the Conservation Board, is - and I have a list of the wells here and I think I showed it to Mr. Stevens-Guille and discussed it with you one day - this report shows gas flared in Turner Valley North of Sheep River and the daily figures in 1945 show 8,600,000 cubic feet flared per day in that area. Then am I to understand that the reduction of your suction pressure to 200 pounds will bring that down to the figure that you have in your column 5, table 1 of M-2?

A That is correct, sir, in so far as our estimates at the time they were made up were correct. These situations have to be reviewed from time to time. Where it would bring it to exactly that figure in the amount of course I could not say without further study of it when we get down to the 200 pounds.

Q I mean taking this figure of January 1945 and this covers a number of wells in the North end of the field, that amounts to some 3 billion a year in that portion of the field alone. I think I showed you this on one occasion and I wondered whether, having that report in mind, or whether you had that report in mind when you reduced this figure to 1,910,000 a day which is roughly a quarter of the amount shown by the Board's figures.

A Now I think that report was made up prior to that occasion, sir. It was based on the information of several months ago

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and as has been past practice these points have to be reviewed. There are one or two wells operating in the North end with bottom hole chokes. It is quite possible that an alteration in the choke sizes might make the operating pressure at the tubing head sufficient to enter our system, when you reduced those. In addition of course, the point that you have already drawn attention to, the fact that these figures were made up, supposing that the suction pressure at the compressor station No. 1 would be 200 pounds. You notice under column 1 we put 180 to 200 pounds.

Q Yes, I see that.

A The point there being that in summer we might have a sufficient capacity to hold the field down to a lower pressure than in winter without any additional horsepower being installed. The load on the machines is obviously lower when there is no gas cap travelling. So we had that factor also in mind when we arrived at that 1,910,000 average per day per year.

Q So that the figures, as shown by the Conservation Board, as to gas flared in January does not in any way lead you to qualify your figure as given in column 5?

A Not at the present time, sir.

DR. BOOMER: Will you read me some of those tubing pressures?

MR. BLANCHARD: I can run through them. Ace Royalties, tubing pressure 425; Alberta Oil Incomes, 350; Alberta Oil Incomes No. 1, 1200; Model 1, 290; Royalite Model 1, 330; National Vulcan, 1100; down to nothing; Northclonmel, 290 down to 220; Home-Millarville 4, 275; Home-Millarville 6, 440; Home-Millarville 7, 580; Home-Millarville 8, 150;

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Home-Millarville 9, 150; Home-Millarville 11, 35; Home-Millarville 12, 225; Home-Millarville 16, 120; Home-Millarville 17, 75 pounds; and Home-Millarville 19, 200 pounds.

A There is one mistake in that, I notice, as you read it. Both Model 1 and Royalite Model are connected and delivering and have been for a matter of months. If you will notice, Dr. Boomer

Q I have a note about that if I may say so. These wells, that is Model 1 and Royalite 1, these wells are tied into the Madison line but occasionally the line pressure is too high to take the gas from them. Perhaps we should eliminate those.

A Those wells, I think, almost certainly will be eliminated when we are down to 200 pounds. You will notice, Dr. Boomer, a large number of these tubing pressures are quite high.

Q DR. BOOMER: Are you going to be able to get those wells into the line?

A That is what we are investigating. Whether or not the operators will bring them to the point where they will come in and stay will have to be seen.

Q My information is today that you will not get that gas, or very little of it.

A Well I have not seen the volumes against each well load.

MR. BLANCHARD: I have nothing more, thank you.

Q MR. FENERTY: There was one question I would like to ask Mr. Stevens-Guille. In Exhibit 48, and I quote from the third paragraph on page 1. You say in the middle of the third paragraph "Of the volume gathered, only a proportion is available for sale in the market, certain percentages being used for field operations, including blow-downs, lease fuel, fuel to heat gas gathering lines, plant fuel

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and shrinkages in processing the gas in absorption and scrubbing plants, etc.". In your tables you gave a consumption involving the drilling of wells. You say volume of gas used in well drilling. I gather from that that you are treating the dry gas as a residue product and what is left after other requirements are taken care of will be available for the market. That is the dry gas market.

A Yes, Of course as the next sentence to the one you stopped at shows "at the present time some gas is also used for fuel at drilling rigs and for kicking off wells to bring them into production.". That is just a passing phase which is likely to be terminated if not in 1945, early in 1946.

Q The point I am getting at is that you are treating the production of gas as an incident of oil and gasoline recovery operations without any reference to the market for the residue.

A I am afraid I cannot follow that. There is a reference to the market.

Q Well, let us see if you can follow it. You say you estimate that certain gas will be flared as it is uneconomical to gather it?

A Yes.

Q The reason that will be flared is it is produced as an incident of oil well operation.

A Yes, that is correct.

Q And that will be flared, or you are assuming it will be flared, because it was produced without reference to the market for that gas converted into the dry system. No market for it and you cannot get it into the line.

A It was produced

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- Q It is going to be produced but as an incident of oil operation is it not?
- A That is correct, for the motive power for lifting the oil to the surface.
- Q All of the gas that can be used for any purpose other than for heating, you assume is going to be used for these purposes incident to field operation, drilling and other things.
- A Most of those items there that I have listed are essential to the delivery of the gas to the market. You have got to process the gas to take out the gasoline before it is in condition to sell. You have got to purify it and you have naturally to use fuel to run the plants.

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Q There were some of these which were incidents to putting it in condition, but there are others which have nothing to do with that, - for instance drilling, you are going to use gas for drilling of course?

A That is correct.

Q And you are going to produce it on this basis, whether there is any market for the residue or not, because it is necessary to produce it for oil operations?

A Yes.

Q And you will flare it?

A Yes.

Q So that what you are telling us in your report is that there will be something left over for what you call the "market", which the market can have, that is about what you are saying, is it not?

A Well there is something left. There will be a large proportion:

Q Yes, but what is left, if the market needs it, it can have it, that is about the size of your attitude in this report, is it not?

A No, I would not say that is the attitude. To arrive at what will be available for the market you must include these other steps, starting with what is available.

Q All right. We will put it this way, some of it will not be available for the market because it is necessarily consumed in producing marketable gas?

A That is correct.

Q And some of it will not be available because somebody will choose to use it for something else?

A That is correct.

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Q Then the market, as I say, it follows, will get what is left, is that not so, according to you?

A Yes, I think that is my position.

Q And then you have, as it follows, have treated the market as entirely in a secondary position, have you not?

MR. CHAMBERS: That is not a fair question.

THE WITNESS: No, I do not think so, because if you study the amount which goes to market you will find it is a large portion of the gas, so it cannot be said to be in a secondary position.

Q Look, you are going to produce gas without reference to the requirements of the market in so far as the gas used for lifting oil and which is not considered in this report, will be gathered?

A Yes.

Q You are not going to pay any attention if the market does not need it, you say it will be flared in some cases?

A Yes.

Q And in some cases it will be repressured?

A Yes.

Q And that happens as an incident to oil recovery and gasoline recovery and purely as an incident to those two things? does it not?

A Yes.

Q Yes, and when you have done all those things, no matter what the market requirements are, if they happen to be at the peak load period, it will only still get what is left, that you or some other operator does not need for some operations, according to your idea?

A No, not according to my idea at all because drilling fuel

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which is the main item you have reference to, apart from what is necessary to produce and deliver the gas to the market is most unlikely to go into the peak load position at all because the peak load position will not be reached until a number of years, approximating ten.

Q It just happens it will not be reached until then but if it was reached tomorrow, your position is what is left is available for it?

A I do not have to consider the position because according to my submission it will not arrive.

Q I do not know whether my questions are complete or not direct enough in some way but your answers are not direct answers to my questions and I cannot just get together with you in any way. It is probably my fault?

A You are asking me whether I have considered these things. I am answering facts. There are certain things I did not have to consider and that is why they were not considered and I am not going to tell you I did.

Q No, but we did get one thing from you, did we not, that there was going to be some residue perhaps available for market, you say?

A Yes.

Q You say there will be a very large proportion, - I do not care about the proportion at the moment, but there will be some and the reason it is not all available for market.- the reasons are two things; - one is you necessarily consume some of it in getting the dry gas residue in these operations?

A That is correct.

Q I have no complaints about that but I say you have also

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said that you will be using it for drilling operations and other things not incidental to producing dry gas, is that not your position?

A That is correct, but that does not have any bearing upon the availability of the gas for the market on the peak load, which is the question you put to me.

Q All right, we will follow that through, - only a proportion will be available because you want some for something else and because some of it is absorbed in giving you that kind of gas, we have that?

A That is correct.

Q So that I say so far as the market is concerned it is a residue proposition, a residue incidental to gasoline and oil production, is it not?

A You can put it that way. It is one person sharing in the gas which is available, would be another way of putting it.

Q We both realize what I am driving at, but I am suggesting to you in considering what the market is entitled to, you treat it as a secondary operation and I am wondering if you are going to treat it as a secondary operation when you consider the cost of these things?

A No Sir, that is where we differ. I do not say I treat it as a secondary consideration. The object of this report was primarily to find what gas was available for the market, primarily, not a secondary reason. If it was not for finding it for the market, I would not be here with this report.

Q I will just put it this way, it will not all be available for the market for two reasons, - one, because some of it is consumed in producing marketable gas and another reason is you want something for something else?

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A A large part of the time some of it is used in the field for drilling purposes but let us be clear, when you raise the point, that that is not fair whenever we are talking of peak supplies for Calgary.

Q All right now, we will leave the peak load for a minute, I have now one thing from you, that from your point of view, There will be some gas for somebody else who wants to drill wells in the Valley, it does not matter what Calgary does for gas, you told us that is going to go there first?

A No Sir, you have not got that from me and that is our very point of divergence.

Q Have we not?

A No.

Q Have we not talked about what will be available for fuel for drilling?

A Yes, but the whole purpose of this report, there is always gas available for the fuel market requirements of Calgary as we have estimated them up to the time that the well capacity down there becomes too low.

Q Well now I seem to have got into something again, I am trying to pin you down to something, You do say that of the volume of gas only a portion is available for sale in the market, now it is only available no matter what the market requirements are, is it not?

A Yes, but you are taking one little bit out of the report which covers a period of 30 years and you cannot take one little bit out and indiscriminately apply it to any year of the 30 years you want to.

Q Do you think 30 years has anything to do with the gas available for the market?

A I am quite certain that this statement is correct according

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Cross-Ex. by Mr. Fenerty
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to the information which we have got.

Q All right, I will leave it. I just cannot get anywhere and I will leave it?

RE-EXAMINATION BY MR. CHAMBERS

Q Mr. Stevens-Guille, following up what my learned friend Mr. Fenerty has said, talking about the part of the gas that does not go to Calgary, which you say is going to be there for drilling operations?

A For a certain period of time.

Q And those drilling operations result in, - we hope, - in additional production of certain products, is that not right?

A That is correct.

Q And those products are petroleum and natural gas?

A That is correct.

Q In other words the drilling fuel, if the drilling operations are successful, increases the gas supply for Calgary or any other market?

A That is right.

Q And part of the gas will be used or taken up in the absorption plant?

A That is so.

Q And the treatment of the wet gas in the absorption plant, as I understand it, is a necessary operation in order to make the gas available for Calgary and the other markets?

A Very definitely.

Q So that as I understand it the only gas that is wasted is what we speak of in these reports as being "flared", that is so?

A That is right.

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Q And one of the reasons it is being flared, as I understand it, is because people, either Calgary or somebody else, would not pay enough to make it worthwhile to gather it?

A That is the measure on which we have based our estimate.

MR. FENERTY: Now you are back on your economics.

MR. CHAMBERS: It came out of your questions.

Q MR. CHAMBERS: I think you told my learned friend this morning, so far as the engineering and mechanical operations, there is nothing to stop all the gas being collected?

A No, that can be done.

Q Now referring just a moment to a question which Mr. Blanchard dealt with, as to the figure of the Conservation Board of the daily amount of gas being flared as at the first of 1945, when was it?

MR. BLANCHARD: January 1945.

Q MR. CHAMBERS: January 1945, was 8 million a day, was it?

MR. BLANCHARD: 8 million 600 thousand, that is in the North end.

MR. CHAMBERS: Yes, in the North end, 8 million 600 thousand.

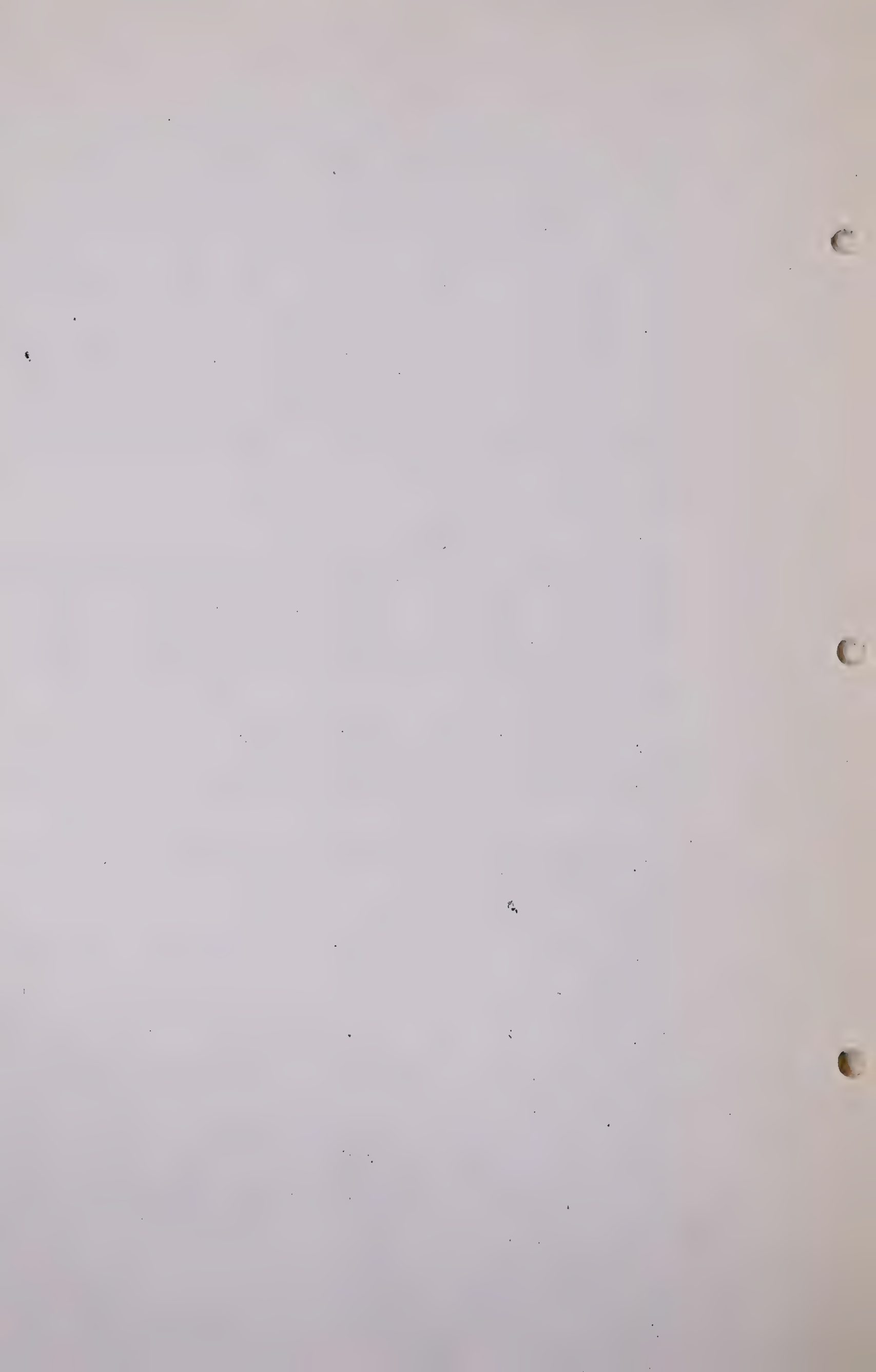
Q MR. CHAMBERS: Mr. Stevens-Guille, will you look at Exhibit 47, Table I, there under column 5, there is an item of 1.9 billion?

A Which Table is that, Mr. Chambers?

Q Table I, Exhibit 47, column 5, 1,910 thousand per day being flared?

A That is correct.

Q And that is because the producing pressure is too low. Now will you turn to summary A in that same exhibit and under



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column 2 (A).

MR. BLANCHARD: Column 2A?

MR. CHAMBERS: Yes, now we are talking about 1945, that 23.8 is the yearly figure, is it not, is the total after 1945.

A Which 23.8, you say?

Q Yes, in column 2A?

A The total for column 2A, wait a minute, I may be in the wrong report.

Q Exhibit 47?

A Yes, I was in Exhibit 48.

Q Now I suggest to you, according to my study, that the daily figures of the Conservation Board for January 1945, A part of that 8 million odd today is included in the one million 910 thousand in column 5 of Table I and also part of it is included in the 23.8 in column 2A in summary A.

MR. BLANCHARD: Do you mean a different part of it or the same?

THE WITNESS: Yes, there is a point, Mr. Chambers, that is true enough, that I overlooked in my answer to Mr. Blanchard. the wells which are never connected, which will not be connected to this system, have been included in that second item which covers the whole Madison System, so that 23.8 in that column 2A in Summary A does not apply only to the wells north of Sheep Creek but also to the wells South of Sheep Creek too, and the figure of 1,910 applies to the wells that have been connected to the system and therefore are considered year by year in this table. There are two, - to reconcile our figures with your figures, there would have to be figures taken out of these two places

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and put together.

MR. BLANCHARD: I really do not understand your explanation. I am quite content to accept your statement that in using the figure 1 million 910 thousand, that you had taken that figure as being the figure after you had got your compression or at least your suction pressure down to from 180 to 200 pounds but I do not understand this present explanation. Perhaps I can discuss it and not waste time at the present moment?

A Yes, I think it would be very easy with a few more figures in front of one, to show you, Mr. Blanchard.

Q MR. CHAMBERS: The 1910 thousand is gas which is now connected or to be connected to this system, but will not be connected up --

A Or has been connected at sometime but not necessarily in 1944. Some of these wells have not been producing into the system.

Q And part of this 8½ million is being flared and never was contemplated being connected?

A Being connected, that is correct.

MR. CHAMBERS: I have no further questions, unless Mr. Stevens-Guille has something to add.

THE WITNESS: No, I have not.

CROSS EXAMINATION BY MR. BLANCHARD

Q I was going to ask another question, is it true that supposing that natural gas were worth five cents a gallon, or were worth nothing, that it would still be necessary to put all the gas through the absorption plant before it could be used by domestic consumers?

A If it carries the gasoline content that the gas we are

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handling today does, yes.

Q That is what I mean?

A Yes.

Q So you would have to have the absorption plant to take out the gasoline?

A Yes.

TO DR. BOOMER:

Q To follow up that question, what is the total drilling fuel you estimate as being required for the rest of the life of the field?

A Well we estimated it here, as I was saying this morning, on a drilling program which then appeared to be probable but we might have to revise this to cover a small use of burning fuel in 1946 but on present indications there is no reason to assume that any drilling fuel will be used after 1946.

Q Well what is the total, say to the closest billion?

A Well I have not studied the number of wells drilling lately, since this was made up.

Q So it is liable to be 5 billion or fifty billion?

A Oh no, no, the order of it will be less in 1946 from that shown for 1945 and the figure shown for 1945 in Table A of the report M-2A, and it is the same in the report M-2 revised, is 1 billion and 95 million for the whole year, so in 1946 definitely the probable amount to be used for drilling would be well under a billion.

Q How many wells?

A Well you did not give me time to go back, backwards, I just made that as a general statement knowing that the number of wells drilling today is in the order of 8 to 10

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and that the outlook might be 3 or 4 drilling into 1946.

Q It is purely an academic question. Suppose the Conservation Board permitted the waste of gas even though you had no market for it. How far would the oil producers go in making a market for it to get rid of his oil?

A I do not know that I quite understand that question.

Q Well for instance it has happened, I believe in Texas, where the oil producer paid to get his gas taken away to the transmission lines so that he could produce his oil.

A Do you mean to say there was an order of the Board which prohibited flaring gas?

Q Yes.

A And it was up to the well operator to provide means for returning it to the formation?

Q Or market.

A Or marketing it. Well that is of course a question of economics. I am not in a position to answer it now.

Q Exhibit 50, will you give me some information about it. You have the British American, Gas & Oil Products, Madison areas. : My information is that the areas were chosen by Dr. Katz or Mr. Trammell.

A These were the ones chosen by Dr. Katz. It says B. A. area, which area does that cover. They have not been corrected to a common area. They were made up actually by what Dr. Katz called the B. A. area, areas covered by Dr. Katz, etc., by other people.

Q MR. STEER: Did I understand that this Exhibit 50, Mr. Stevens-Guille, that the areas referred to by Katz, Davies, Connell and so on may be different areas?

A My understanding was that their areas are a little different in their submissions.

Q DR. BOOMER: The areas are all a little different?

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A A little different.

DR. BOOMER: Now gentlemen, Dr. Katz has a report to make and it was suggested that he make it in the morning. Alternatively, he might make it now and Mr. McCutchin, the next witness will go on tomorrow. What is your pleasure about that?

MR. BLANCHARD: Mr. Commissioner, I would prefer if Dr. Katz would go on in the morning because I have not had an opportunity to go over this report since it has been typed.

J. A. McCUTCHIN, having been previously sworn, re-examined by Mr. Harvie:

Q Mr. McCutchin, you have been on the stand in this inquiry and have been sworn already.

A During the May session, yes sir.

Q And at that time you submitted certain estimates of gas reserves and reports which were contained in Exhibits 1, 1A, 1B, 2, 3, 4, 5?

A Yes sir.

Q And have you anything further to add to the information given at that time?

A I have brought up to date my original figures which were presented during the May session, that is, I have brought them up to the 1st of December 1944, which was all the information I had at the time this report was filed.

Q And that information is contained in what is already deposited with the Board in your report B. A. No. 1?

A Yes sir.

Q I might tender that as an Exhibit.

REPORT REFERRED TO B. A. No. 1 NOW
MARKED EXHIBIT 51.

You might go ahead and read that report.

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A I will read the letter of transmission which is the first page. "We attach hereto tables 1 and 2 showing the method used in the calculation of the recoverable gas reserves in the B. A. area as of December 1st, 1944. Our estimate of the recoverable gas reserves is 50.851 billion cubic feet, in the B. A. area.

Table 1 was presented to the Board on May 9th, 1944, and Table 2 indicates adjustments necessary to bring the reserve figures previously presented up to date as of December 1st, 1944."

Referring to Table 1, I might say that I first began studying the gas reserves and surface conditions in the Turner Valley field approximately two years ago. The area of the field has been of particular interest to me because of the position of the B. A. absorption plant in the area and of course both the oil reserves and gas reserves are very much related to the life of an absorption plant. I have made what to me is a quite thorough and satisfactory study of the conditions there and accumulated a considerable amount of general information and chose to estimate the reserves on the basis indicated in Table 1. The basic figures of course pertain to bottom hole pressures and gas production primarily. The relationships are quite uniform, at least as uniform as you could expect in a problem of this kind. The area is an old one having produced some 283.5 billion cubic feet up to the end of 1943. The future gas to be estimated there is relatively a small amount, somewhere in the vicinity of 50 billion cubic feet so any method used which takes into account its past history would give a reasonable result of future expectations providing the assumptions regarding the end period are reasonable. Referring to

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Table 2. In order to get a broad base for an estimate of this kind I took data from an entire area, all of Township 18. Of course that adds to the accuracy and keeps small discrepancies out of estimates, to take a broad area, and then to reduce it by small areas, methods of this kind are not particularly adaptable to individual wells or small areas due to migration and other factors that come in, so I chose to take an area bigger than the B. A. area itself, all of Township 18, and then reducing it by the actual acreage in the B. A. area which proved - from a map by counting the acreage productive - to be 74.34% of the total area. This then gave a recovery reserve as of 1/1/44 of 57.335 billion. Between the time the original estimate was made and December 1st, 1944, there was one new well completed, Imperial Turner Valley No. 1. On the estimate made the gas additional would be 1.056. In doing that I used decline curves. I had not enough production data to apply this method to it and as this method is not applicable to individual wells anyway, I also did not have enough detailed information on the well itself to use the decline method on that well so I used the declines around the well, a method described by other people here using the decline method. It is somewhat better than a guess but I would not guarantee anyone that my 1.056 is the absolute optimum quantity of gas that this well will produce. It is the amount of gas which I think is a reasonable amount and is probably a low figure for that particular well. Then there was one well in the area which was abandoned. That was Okalta 7, between the time the original estimate was made and December 1, 1944, making those adjustments, I arrive at an estimated future gas to be produced in the B. A. area of 50.851 billion cubic feet. I also have studied

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the production record using decline methods in each and every well in the south part of the field and have made independent estimates of the future gas to be produced, assuming that oil wells would become non-important as gas producers when the oil production was 10 barrels per day. The assumption of 10 barrels a day which might be referred to as an economic limit is based primarily on the fact that there are certain wells in the south end of the field which are still producing, but their oil production is 10 barrels per day.

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A I am not certain that all oil wells will do that, will produce gas at a rate of 10 barrels per day, nor am I certain that certain oil wells will not produce a large amount of gas when their oil production is zero. But in order to arrive at somewhat of an end point, a break-off point, I chose that figure. These individual estimates based on the oil area and estimates from the gas cap as a group check the original estimates within 5%, the summary of details being 5% higher than the original estimate. I was satisfied after doing that that this estimate was a reasonable one and perhaps a bit on the conservative side. I always like to stay on the safe side when I have a large investment in an area. I do not like to take the optimistic view because I have got to get that quantity of gas out, I believe, in order to make the thing sound, so that I have chosen that my estimate of gas reserves in the B.A. area as of December 1st, 1944, is 50.851 billion cubic feet.

Q MR. HARVIE: Just in arriving at that figure referring still to Table 2, Mr. McCutchin, I take it that on the estimates that you filed previously for reserves as of the 1st of January, 1944, there was 57.335 billion, and then there have been three adjustments to bring that down to your present estimate of the 1st of December, 1944, the first being an item of 7.24 billions produced within that period?

A That is right.

Q Then I understand that your original estimate was based on an area basis, that is 74.34% of the total production, and you have added the Imperial Turner Valley No. 1 well, and later you deducted the Okalta No. 7 well. Am I right in

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taking it that the reason those changes were made was, firstly, that the Imperial Turner Valley No. 1 well increased the area in your original estimate?

A It was a new well, the Imperial, but subsequent to the time that your original estimate was made, and being a new well, an additional pressure was available on it, which went into the pressure averages, so that therefore it was necessary to add an estimate of its reserves.

Q And the reverse is the case with regard to Okalta 7?

A Yes, for the same reason.

Q Thank you, Mr. McCutchin.

.....

CROSS-EXAMINATION BY MR. STEER.

Q Mr. McCutchin, that 50 billion you speak of, that is your figure of recoverable gas?

A Yes.

Q And computed on the dry basis it would give us what quantity?

A There would be first the gas which is used on leases which has been estimated at somewhere around 21 $\frac{1}{2}$ %. I think that might be a reasonable one. Next would be the gas which is used in the absorption plant as fuel and liquefied, which would be 7.36%. Now, wait, I will take that back. Let me start over again.

Q Perhaps I can shorten it. Exhibit 50 gives us your B.A. area of 50.9 on a wet basis, and 38 billion on a dry basis. Would that be right?

A I do not have that in front of me right now, but I will say from the time the gas gets to the absorption plant until it gets through the plant, as the plant is operating

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Cr.Ex. by Mr. Steer.

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now, the shrinkage amount on the basis of 20 million put through the plant per day, is 13.3%. Now the earlier estimate we made we did not have all that added, the fuel gas charged to, into the boiler house, the re-absorber gas and the gas from repressuring, that was being flared. We also had a water pump at the river station which was operating with high pressure gas. At that time there was no market for the gas. It had to be burned at some point, so that it was burned there. For that reason higher estimates of shrinkage were using used in the B.A. plan in the earlier estimates. Recent changes in the plant itself has brought the shrinkage factor plus the fuel used in the plant plus the fuel used in the compressors, and where it is currently used, and that is 13.3% when 20 million cubic feet are going through on a wet gas basis.

Q And the 20 million cubic feet being put through as you operate the plant?

A That is the volume through now. That is the amount going through.

Q And that is the amount you expect to continue?

A That will continue depending on what is done about net allowables and Brown allowables, and all those things. It will certainly be no more than that. It will be decreasing somewhat in the future.

Q How soon?

A Well if I could make some assumptions that we stay on the Brown allowables, if I might make the assumption that we stay on the Brown allowables, and put gas back into the gas cap, and if the gas cap allowables are based on the pressure in the gas cap, we will have 20 million feet through

the plant for this year, you see, because we will be putting back into there almost as much as we are taking out, not almost as much either, but we will be putting back in depending on longer efficiency and on the market sharing position, how much you are going to sell. You see when you come to make these assumptions the whole thing ties in. If you will tell me to assume a certain market sharing position, how much gas you are going to sell, and then you can be better able to arrive at what it will be.

Q What I am interested in at this moment, Mr. McCutchin, for what length of time - perhaps I will put it this way; First, your plant is designed to operate most efficiently with 20 million daily load?

A That will leave our compressor stations. Yes, I would say that is the highest efficiency, no gas being wasted at any point.

Q Then for what length of time do you figure that you are going to get that plant loaded with 20 million cubic feet a day?

A Are you willing that I make my own assumptions from there on to answer the question?

Q Yes?

A I will say this then, that based on the fact that in the past there has been a 10% decline in gas production from the B.A. area each year, when 7.2 billion feet has been produced, now since we are going to be repressuring in the area that 7.2 billion cubic feet will not be taken from the area and no doubt some of it will stay in there. So that on that basis we will be able to stay on the 20 million a day the first year approxi-

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Cr.Ex. by Mr. Steer.

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mately, 19.7 the second year, 17.7 the third, 17.7 the fourth, 17.7 the fifth, 15.9 the sixth, and ending at 1954 with 15.9. Now to do that I have assumed that six years from now we will go off the Brown allowables. It would not be 25 barrels of reservoir fluid per acre per day.

Q I see.

A And if that assumption is based again on the fact that time, six years from now the oil wells will be so near the economic limit as a group, that with the repressuring program in effect where nothing is wasted, I believe it becomes reasonable for every person in that area to do the most they can to keep the area on an economic basis. I am taking my chances that will happen.

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Q Now your compressor equipment for repressuring has 20 million a day capacity, has it?

A The compressor equipment is of a dual purpose. It can handle 22 million feet per day if all the gas goes up to fuel, that is going on a 450 pounds discharge but if it is going to repressuring only it can handle about $13\frac{1}{2}$ million per day with the pressure necessary to pressure as 800 pounds and the compressors will do their job alternately if not simultaneously.

Q What do you figure is the highest quantity of gas that you would have to repressure?

A I figure if the sharing position is set at somewhere around 20 or 21 per cent of the market that the highest amount we will ever have to repressure in any one year is 3.69 billion.

Q You have got a capacity for 13 million?

A Per day. This is 3.69 billion and you will have to divide that up to see what that will be per day.

Q It looks about 10 million?

A These are averages now. 3.69, that is just about 10 million.

Q Yes, and then will you discuss the question of peaks.

A Well the peaks can be as far as the system is concerned, the peaks can be trimmed very materially by the use of about 12 gas wells which are now operated in that area. When we need them we can use them temporarily and we can produce them to meet the market demand so as not to overload our equipment. We even vary them as of daytime and night time. We use them and have them available to smooth out the operation. They can be held in to meet the peak for market as well as peaks of operation.

Q Let me understand, you have got a compressor capacity for re-storing gas in the formation of some 13 million feet a day.

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Cross-Exam. by Mr. Steer.
Cross-Exam. by Mr. Fenerty.

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A 13 $\frac{1}{2}$ million with a pressure of 800 pounds.

Q Yes.

A It so happens that the bottom hole pressure, of course, is only approximately 500 pounds. We could put a larger quantity back when the pressure in the formation is 600 pounds. The displacement, of course, gets less and it goes in at a greater amount.

Q Yes.

A So if it is 800 pounds - we have never operated at 800 pounds except at one time when we only had one in-put well. So that by using more in-put wells we have considerably more flexibility, I would say the minimum amount is 13 million a day.

Q Then I think you told me that your - and I am perhaps trespassing here and I have overlooked the fact I should not have been asking these questions, but just to complete it - your maximum capacity that you have to restore to the ground on present operations is about 10 million feet.

A That is right. That of course assumes that this
I want to make it clear because perhaps someone does not know that when we were putting in the 13 $\frac{1}{2}$ million at 800 pounds, I had no capacity for selling gas to the market at that time. This cannot be done concurrently, it has to be alternate.

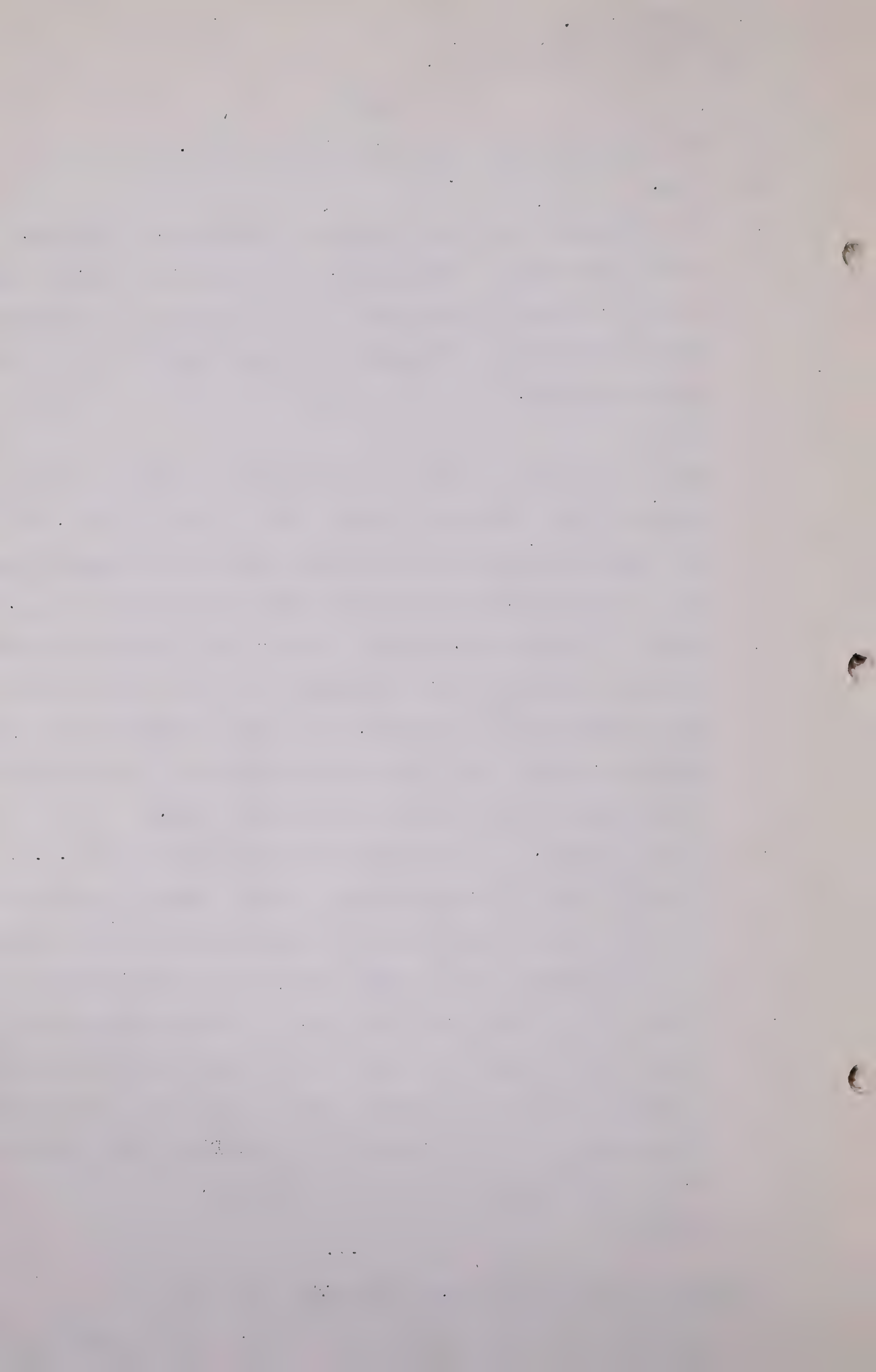
Q I think I will leave that and I will warn you that I am going to ask you sometime later if you will give us the probable future history of the capacity of your Plant both for delivering to the market and for repressuring.

A Very well.

.....

CROSS-EXAMINATION OF THE SAME WITNESS BY MR. FENERTY:

Q Just one question I would like to ask. I was interested in this question that you asked about the production of gas



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from wells that had ceased to have a useful life as oil wells. Now I have some information that indicates to me the history of a particular well and I do not want to mention the well at the moment unless I have to - but a well hooked up to your gathering system and I want you to tell me whether I have my facts straight.

MR. CHAMBERS: You are not ashamed of this well, are you, Mr. Fenerty?

MR. FENERTY: No, I know about it.

Q I suggest to you that you have on your gathering line a well which was operated as an oil well for some years with separator production in the ordinary way that for a period of perhaps, I do not know the exact time but perhaps anywhere from 2 to 4 years since it has been abandoned as a producing oil well in the sense of producing through the separator, it has been hooked up to your absorption plant system and has been producing gas going into your absorption plant system. That has been going on for about anywhere from -- I do not know just how long but 2 to 4 years, involving an operating expense of a very substantial amount and rental. You have such a well hooked up to your system, have you not?

A I think we have quite a few of them. I do not know which one you are referring to.

Q I am referring to Mar Jon No. 2.

A Oh yes.

Q Now that is not a unique well is it?

A Well we operate this particular well on an operating premium with the owners. This particular one. We operate this particular well, the British American operates this well under a special operating agreement with the owners. In that respect it is special.

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Q You are not operating it for the purpose of losing money on it.

A Well that is a problem.

Q Oh.

A That we are holding off on. We are holding off on this thing to know what we are going to do. As a matter of fact the total expenditures against that well that we have to pay, plus \$25.00 a month that we give the owner as rental - which deal was made a long time ago - is pending between us. We have discussed it several times. He comes out and asks us what we are going to do about it and I said "You make your choice."

Q Do you know how long you have operated that well?

A About 2 or 3 years if I remember right.

Q Now you had some reason for operating it, hadn't you?

A Yes, we have some reason. It is a very handy well to have in order to smooth out our peak load. We use it at night and other times in operations so that we do not have to interfere with the oil well operators so much. For that reason it is of interest. In other words we would operate it breaking even because we can use it at a time it is necessary to use it.

Q That reason may not be an economic one in itself?

A Due to the fact that we can open it at night and close it the next day, we find it is economic to keep on production.

Q Would that have anything to do with the possibility that natural gasoline is obtained incident to any other operation?

A Natural gasoline, which we obtain from this well, of course under our special agreement we pay the owner \$25.00 a month for whatever we get out of it, gasoline and so forth. If I recall this agreement properly, whatever we get, absorption

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gasoline, etc.

Q What I am getting at is I just cannot believe it is a philanthropic operation and you have some reason for that.

A This approaches that nearer than anything you can think of.

Q This is the first one we have heard of in the oil industry so far if it is. I am going to suggest something else to you. I suggest to you that possibly the gasoline content that you obtain through the absorption plant operations are material elements in other operations, such as refinery operations and it might have a direct bearing on that. Is that so?

A Your question is - you are leaving this well problem. I do not follow you exactly. You have gone to a refinery problem.

Q I think you do.

A No, we are through with the well and we go to the next one. You are asking me about absorption gasoline used in refineries, is that the question?

Q Yes.

A Absorption gasoline as I understand it, we sell it or deliver it to the Valley Pipe Line and they in turn store it, I believe; and the Turner Valley Pipe Line finally deliver it to the Government outlet plant where certain elements in the gasoline are taken out, such as iso-butane and what is left that goes to the refinery.

Q I have heard it suggested very recently, and I suppose seriously, that there might be a distinct relationship between the production of absorption gasoline and - not in yours - but between the production of natural gasoline and the extent of refining operations. I think I heard that quite recently.

A I hardly feel qualified to testify regarding refinery operations. It is outside my department.

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Cross-Exam. by Mr. Fenerty.

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Q What is that?

A I say I hardly feel qualified to testify regarding refinery operations. That is entirely outside my department. I have nothing to do with it at all. We can get you a witness if you would like to have one to discuss the use of absorption gasoline in a refinery.

Q The point that I want to get at is, I understand at all events that for a certain period of time you may well have an operation which is abandoned as an oil well operation but which still is an economic operation from the absorption gasoline point of view. That is what I am trying to get at.

A Well of course that is purely a matter of economics, how much are your allowables and one thing and the other and the sales of residue gas and the total revenue and the amount of the total expense would all be considered.

Q This particular well we are talking about, perhaps before you came here there was some kind of an arrangement that that would be done and I assume that the B. A. Oil Company did it because there was some benefit somewhere in it or supposed to be some.

A At that time when the agreement was first made I believe that the volume through the plant was some $9\frac{1}{2}$ million per day. It was down very low. It might have been the situation at that time but it was only for a 2 year period I believe. I think it expired, if I recall correctly, or it is up for consideration again.

Q Can I put it this way, as a result of that and perhaps some other wells, I do not know, it is reasonable to assume there will be for a more or less limited period, some benefit in operating the well for its natural gasoline content after it

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ceases to be an economic factor for crude oil.

A I say we will have to look at the problem at the time. The operating costs of a lot of these wells are extreme. We have cases where the rental is somewhere around five hundred dollars per well and in other places it is two hundred dollars. I would not say these things become economic until you see what the total income comes to and the total outlay. And then you can consider the question. It has to be taken up by each individual well.

Q Is that the only well in the Valley that you know of that is being operated for its gasoline content after it ceased to be a crude oil producer?

A I do not know. I do not know too much about anything except the South end. We operate some Royalite wells on an operating agreement, not this type of agreement, processing the gas.

Q When you were operating that Mar Jon well for this period of several years, I take it that the dry gas was being flared?

A Except what was sold for drilling fuel.

Q It was not being operated for a dry gas operation?

A Except what was being sold for drilling fuel which was a small amount.

Q Thank you.

.....

CROSS-EXAMINATION OF THE SAME WITNESS BY MR. McDONALD.

Q Mr. McCutchin, last May I think I cross-examined you at considerable length in regard to the South end of the field and has anything occurred since that time which would change your views as to the production characteristics in the South end of the field?

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A No sir, I can think of nothing, certainly nothing significant that has happened since then, that is as far as I am concerned.

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Cross Exam. by Mr. McDonald
Cross-Examination by Mr. Chambers

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Q Just one question in regard to the shrinkage, I think you gave a total of 13.3 percent?

A Yes.

Q Now would you add the $2\frac{1}{2}$ percent to that?

A That would be deductible before it gets to the plant, that is not in the plant itself; in the plant, from the time the wet gas gets into the plant until it goes out and also the fuel for the compressor is deducted, is deducted from that, that is in the 13.3 percent.

Q But the $2\frac{1}{2}$ percent is not?

A No, that is in addition to that, from the time it leaves the well head, from the well head over, you add $2\frac{1}{2}$ percent to that.

MR. MCDONALD: Thank you.

CROSS-Examination by Mr. Chambers:

Q Mr. McCutchin, in your estimates in Exhibit 51, I think you told us you carried it down to a limit of 10 barrels per day, in the crude area?

A In checking the estimates by the decline curves I did assume wells would not be important to gas producers when the oil production was 10 barrels per day.

Q And the time comes, of 10 barrels per day on the average, probably when those wells cease to be crude producers, is that right?

A Well a crude well with less than 10 barrels per day is very small, it is not important from the crude standpoint.

Q And from then on I suggest to you, whether the well ceases to operate as a gas producer well, depends to a considerable extent upon how much you can get for the gas at the well head, is that not right?

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Cross-Exam. by Mr. Chambers
Cross-Exam. by Mr. Blanchard

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A Well it does of course. It also depends of course on its position on structure, its gas-oil ratio, how much gas it takes to produce it --

Q Assuming it is kept to produce gas?

A Yes.

Q The operator will take more gas out of it, depending on the price he can get for it?

A Naturally, because his income will be from the gas mostly.

CROSS-EXAMINATION BY MR. BLANCHARD

Q Have you any wells that are in the crude area, tied to your system, that are producing less than 10 barrels of oil per day at the present time, in the oil area?

A I think it is either the Sunset or Sunburst Well, one of those wells is down to 8 barrels.

Q And what gas?

A I do not recall the exact figures but most of these wells have somewhere around 200 thousand cubic feet of gas per day, the normal gas wells. That would be 6 million a month, would be a pretty fair figure.

Q That is the capacity?

A That is the Brown allowable at the present time. That would not be the capacity. Most of those wells would have a greater capacity than that. They are only operated a few days per month generally.

Q You have no idea of the capacity of those wells?

A Well no, I have not tested them myself. We do not operate the wells, you understand. They are operated by the owners, and we only take the gas so our knowledge of the daily, as to what he could make it if he opened it wide open, we just do not have it.

J. A. McCutchin
Cross-Exam. by Mr. Blanchard

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Q At what point in capacity does a well become uneconomical from your standpoint?

A Well we do operate --

Q As a gas well, not an oil well?

A I cannot do better than tell you one or two facts. We operate a well known as Trail Oils, which has approximately 400 barrels a month, which is not/more than 10 barrels a day, it has an allowable of about 6 million feet of gas per month and we pay certain other expenses, such as ground rentals and taxes and what have you, and we are getting along pretty well. We are still above the economic limit of that particular well. The royalty there happens to be 20% if I remember correctly and there are all those factors which enter into an answer to your question. Now if you wish me to assume some of those things you can sit down and calculate it out but there are quite a few wells in the South end of the field that are hanging on now on the economic hope that they will get something for gas at a future date.

Q And do you anticipate that there will be a number of wells that will become, --well really become good gas wells in the oil area?

A Yes, I am convinced, we have already seen it happen as a matter of fact. I can say that we have wells that used to be oil wells, that have now entered into the 30 thousand gas-oil ratio classification and have been classified by the Conservation Board as gas wells. Now those wells are on the edge of the old gas cap and they are good gas wells now.

Q Just as good as the gas cap wells?

A At the present time, yes. The permeability is variable but

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Cross-Exam. by Mr. Blanchard

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they are good gas wells.

Q And they have a capacity as big as the gas cap wells?

A Well their capacities as individuals, - I would say as a whole they are just about as good as the others are.

Q Are these wells you have just mentioned that are in the classification now as gas cap wells, they are included in your estimate I suppose, you included those in your estimate?

A Yes.

Q Of the gas and oil?

A They are included as, - in this estimate at this time as both?

Q Both?

A Both together. They are both together in the same estimate and when I went to check the record, check the estimate by using decline curves, I took all wells which were placed with 30 thousand gas-oil ratios as being gas wells and they were treated as such.

Q And you did not knock them off the line when they were down to 10 barrels a day because they did not produce any oil to speak of?

A That is right, they are gas wells by definition.

Q So you were not ceasing to produce those when they got below 10 barrels of oil?

A No, not these gas wells, no, they are gas wells.

Q That is what I am trying to get at?

A But I would point out, I believe I should point out, that while these wells near the fringe of the gas cap have had that history and some more will have similar history, there are also some oil wells low on structure which may not have a similar history.

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Q Some may not?

A That is right.

Q But a lot of them may have?

A Some more may have and some will certainly not.

Q Now I wonder what your position is, I was just going to ask you something more about this, I see you have a well, Imperial-Turner Valley No. I well?

A Yes.

Q And I am very much interested in that because I own 1/40 of a 1% preferred royalty, -that produces how much gas a day now?

A I would have to refer to the tables, it is a rather large gas well I know, it has some 15 million a month I believe gas quota. I believe there is a record here.

Q I am anxious to know whether it will stay producing when it gets below 10 barrels a day because it is getting near to that now.

MR. CONNELL: 552 per day.

THE WITNESS: That is about 15 million cubic feet, that is just about what I thought.

Q MR. BLANCHARD: You do not propose to abandon that well?

A I would like to make it clear here, our system may be somewhat different to others, we do not own nor operate the wells. We only have agreements to process the gas and so far as abandoning a well is concerned, that is not our decision at all.

Q That will be up to the Royallite, as far as that is concerned?

A Up to the operators or owners. I would hate to see it abandoned, I would not want to see it abandoned.

Q Neither would I. Now Mr. McCutchin, there has been some discussion of liquid loading and by the way I think in your computation you produce your oil wells down to 250 pounds?

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Cross-Exam. by Mr. Blanchard

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A The average for the area I use 250 pounds.

Q The average for the area?

A For the area, yes.

Q And is that the average you used when you were giving evidence last May?

A Just the same.

Q For the area and not for, - that would be perhaps a higher average for the oil wells area than for the gas cap?

A Yes, I am sure but certain of the oil wells are higher than that?

Q We had some evidence about liquid loading and I wonder whether you agree with Mr. Stevens-Guille and other witnesses, that your production, the capacity of the wells will be considerably reduced as the pressure gets down to say 300 pounds, through liquid loading?

A Well I have had a little experience in other area with this liquid loading which leads me to believe that it will not be so severe as some of the folks might think. There was a period of time when these gas wells, in these old areas, when you would have a maximum amount of distillate condensed in the bottom of the formation, then as the pressure is further reduced, reduced somewhere in the neighbourhood of 200 pounds, between 200 and 100, that the liquid loading seems to be less important. Now the reason for that is it just evaporates, it evaporates and turns into gas and it could be calculated, I presume, knowing the pressures and the temperatures but it does not seem to bother the wells so much. I have run tubing into wells bothered with liquid loading in the past, and I never got anywhere, so a later period of time it may not be so severe.

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Q My information was this, that as you drop from 500 pounds to 400 pounds you would be less influenced by liquid loading and if you dropped from 400 to 300 it would be less and from 300 to 200 less liquid loading, is that correct?

A I do not know that that is exactly correct. I think there is some point in here, something I cannot exactly explain except by experience, there is some point around 500 pounds when it might be the maximum.

Q The maximum?

A Yes, and you might get less from there on down.

MR. BLANCHARD: I see. That is all.

THE CHAIRMAN: Anything more.

Now we can finish between half past nine and half past twelve tomorrow can we?

MR. BLANCHARD: So far as I am concerned I think we can.

THE CHAIRMAN: Well 9.30 tomorrow morning.

(The Inquiry was here adjourned to resume at 9.30 a.m.
March 28th)

